RFP #50-07

ADVANCED PUBLIC TRANSPORTATION SYSTEM (APTS) PROCUREMENT

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SECTION 1.0

SOLICITATION INSTRUCTIONS AND REQUIREMENTS

1.00 NOTICE OF REQUEST FOR PROPOSALS

NOTICE IS HEREBY GIVEN, that sealed Proposals will be received by the SNOHOMISH COUNTY PUBLIC TRANSPORTATION BENEFIT AREA CORPORATION, also referred to herein as COMMUNITY TRANSIT, 7100 Hardeson Road, Everett, WA 98203, until 2:00 p.m., Friday, October 5, 2007. Proposals will be due as follows:

RFP #50-07, ADVANCED PUBLIC TRANSPORTATION SYSTEM (APTS) PROCUREMENT

Date Issued: August 14, 2007 Proposal Due Date: October 5, 2007 Time: 2:00 p.m.

Community Transit is seeking Proposals in response to this **Request for Proposals** from Contractors qualified and interested in providing an Advanced Public Transportation System (APTS) for Community Transit's fixed route, paratransit, and BRT services.

Complete specifications may be obtained from Gerhild Turner, CPPO, CPPB, Procurement Supervisor, Community Transit, 7100 Hardeson Road, Everett, WA 98203, Phone (425) 348-2308.

Proposals **must be sealed to be accepted** with the Contractor's name and solicitation number in the lower left corner of the envelope. All submittals shall contain one complete original and six (6) complete copies in paper form, and one electronic copy in Adobe Acrobat form on CD ROM, forwarded to the following address:

Gerhild Turner, CPPO, CPPB
Procurement Supervisor
Community Transit
7100 Hardeson Road
Everett, WA 98203

Dated: August 14, 2007

SNOHOMISH COUNTY PUBLIC TRANSPORTATION BENEFIT AREA CORPORATION
SNOHOMISH COUNTY, WASHINGTON

By:_____
Jeff Ristau, Chief Financial Officer

By:_____
Gerhild Turner, CPPO, CPPB, Procurement Supervisor

PUBLISH: Everett Herald
Daily Journal of Commerce
Passenger Transport

1.01 TERM OF CONTRACT

Community Transit seeks to issue a contract for the supply, installation, testing, integration and warranty of an Advanced Public Transportation System as outlined in Section 2.0 to a qualified Contractor.

1.02 DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION

The Disadvantaged Business Enterprise (DBE) requirements of 49 CFR Part 26 apply to this contract. The requirements of this contract are to encourage DBE participation and to report race neutral accomplishments semi-annually. No preference will be included in the evaluation of bids/proposals, no minimum level of DBE participation shall be required as condition for receiving an award and bids/proposals will not be rejected or considered non-responsive on that basis.

Please go to Section 3.53 for additional information pertaining to DBE requirements.

1.03 NON-SUBMITTAL

If you determine not to submit a Proposal in response to this solicitation, we would appreciate your completing and returning the No-Proposal Form in Section 4.

1.04 PUBLIC DISCLOSURE OF INFORMATION

Proposals submitted under this RFP shall be considered public documents and with exceptions provided under public disclosure laws. Information contained in the Proposals, including price, will not be released by Community Transit prior to contract award in order to protect the integrity of the procurement process unless otherwise required by law. Proposers are further advised that Community Transit may be required to release the Proposal information after contract award. Proposals will be available for inspection and copying by the public after the award has been made.

If a Proposer considers any portion of its Proposal to be protected under the law, the Proposer Shall clearly identify each such portion with words such as "CONFIDENTIAL," "PROPRIETARY" or "BUSINESS SECRET." If a request is made for disclosure of such portion, COMMUNITY TRANSIT will determine whether the material should be made available under the law. If Community Transit determines, in its sole discretion, the material is not exempt from public disclosure law, Community Transit will notify the Proposer of the request and allow the Proposer five (5) Days to take whatever action it deems necessary to protect its interests. If the Proposer fails or neglects to take such action within said period, Community Transit will release the portions of the Proposal deemed subject to disclosure. By submitting a Proposal, the Proposer assents to the procedure outlined in this paragraph and shall have no claim against Community Transit on account of actions taken under such procedure or its determination whether information is exempt under public disclosure laws.

1.05 PUBLIC DISCLOSURE OF PROPRIETARY INFORMATION

RCW 42.17.310(1) (h) states that the following information is not subject to public disclosure.

Valuable formulae, designs, drawings and research data obtained by any agency within five (5) years of the request for disclosure when disclosure would produce private gain and public loss.

Such information shall be submitted under separate cover marked *Exempt from Public Disclosure*. Community Transit assumes no responsibility or liability for any losses or damages which may result from the information contained in the submittal. Furthermore, it will be the responsibility of the Contractor to protect the confidentiality of any information submitted, and the submitting Contractor will assume all liability and responsibility for any information declared confidential and shall defend and hold Community Transit harmless for any cost, penalties, and/or fees (including reasonable attorney fees) incurred in any action regarding the disclosure of said information.

1.06 COMMUNICATIONS WITH COMMUNITY TRANSIT

Upon release of this solicitation document, all communications concerning this acquisition must be directed to:

Community Transit
Gerhild Turner, CPPO, CPPB, Procurement Supervisor
7100 Hardeson Road
Everett, WA 98203
Phone: (425) 348-2308
FAX: (425) 356-3405
gerhild.turner@commtrans.org

Unless authorized by the Chief Financial Officer, no other Community Transit official or employee is empowered to speak for Community Transit with respect to this Request for Proposals. Those who seek to obtain information, clarification or interpretations from other Community Transit officials or employees are advised that such material is used at their own risk and that Community Transit shall not be bound by any such representations and such action may result in rejection of their Proposal.

Faxing information has become unduly burdensome and expensive to Community Transit. All information will be mailed or may be picked up by the Contractor at above address or may be downloaded from Community Transit's web site at www.commtrans.org/go2/rfp

1.07 PREPARATION OF PROPOSALS

A. Contractors shall examine the Request for Proposals' Specifications, Solicitation Instructions and Conditions, the General Provisions, all Exhibits and Attachments and any Addenda that may be issued prior to the closing date. Failure to do so shall be at Contractor's risk.

B. Each Contractor shall furnish the information required by the solicitation. Erasures or other changes shall be initialed by the person signing the submittal. Submittals signed by an agent (other than an officer or a partner) are to be accompanied by evidence of his authority unless such evidence has been previously furnished to Community Transit.

C. Submittals for services other than those specified will not be considered unless authorized by the solicitation.

D. Time, if stated as a number of days, will include Saturdays, Sundays and holidays.

1.08 SUBMISSION OF PROPOSALS

Submittals and modifications shall be enclosed in sealed envelopes and addressed to the attention of Gerhild Turner, CPPO, CPPB, Procurement Supervisor, Community Transit, 7100 Hardeson Road, Everett, WA 98203. Contractor shall show the hour and date specified in the solicitation for receipt, the solicitation number, and the name and address of the Contractor on the face of the envelope.

1.09 LATE SUBMISSION, MODIFICATIONS, AND WITHDRAWALS OF SUBMISSIONS

A. Any submission or modification received at the office designated in the solicitation after the exact time specified for receipt will not be considered and will be returned to the submitting Contractor unopened.

B. The time of receipt at Community Transit is the time-date stamp of Community Transit on the submittal wrapper or other documentary evidence of receipt maintained by Community Transit.

C. Submissions may be officially withdrawn from consideration only by submitting a written request to Community Transit's point-of-contact identified in Section 1.00, prior to response deadline.

1.10 CONDITIONAL/NONRESPONSIVE SUBMITTALS

Community Transit reserves the right to reject as non-responsive any submittal accompanied by insufficient or irregular required security; any submittal from Contractors who have previously failed to perform properly or to complete on time contracts of any nature; and any submittal which is incomplete, obscure and irregular. Community Transit reserves the right to reject any or all submittals.

It will be assumed by Community Transit that the Contractor has accepted without reservation or amendment the whole of the general requirements and legal requirements and contract provisions contained in this solicitation document.

With respect to the contract terms and conditions, a Contractor may note any exceptions or additional provisions that it wishes Community Transit to consider. Exceptions must be submitted on a separate sheet of paper and be cross-referenced to the RFP.

With respect to the technical requirements, Community Transit recognizes that this is a Request for Proposals, and that different Contractors may not fully meet the technical requirements described herein, or may wish to propose an alternative approach. In the event that a Contractor is unable, in part or in whole, to meet stated technical requirements, the Contractor shall, on a separate sheet(s) of paper describe any and all exceptions as follows:

1. Contractor shall identify the technical requirement that it is unable to partially or fully meet by specification number or reference.
2. Contractor shall describe the reason it is unable to meet the requirement.
3. Contractor shall describe any alternatives to the requirement that it is able to meet

Minor or limited exceptions will not be considered grounds for Proposal rejection, but will be considered during the Contractor evaluation and negotiations process along with any alternative proposals by the Contractor.

Note: Community Transit reserves the right to reject any or all Contractor-proposed exceptions or additional provisions to the terms and conditions, and other requirements without comment. An excessive number of exceptions or failure to disclose such exceptions may cause the Proposal to be viewed as non-responsive.

1.11 SINGLE PROPOSER

In the event that only one proposal is received, Community Transit will conduct a price or cost analysis of the proposal, or both, and the Proposer hereby agrees to such analysis. A price analysis is the process of examining the proposal and evaluating the separate cost elements. A price analysis through comparison to other similar awards must be based on an established or competitive price of the elements used in the comparison. The comparison is to be made to the procurement of similar services and involving a similar scope of work. Where a difference exists, a detailed analysis must be made of this difference and costs attached hereto.

Where it is impossible to obtain a valid price analysis, it may be necessary for Community Transit to conduct a cost analysis of the proposed price. The price or cost analysis shall be made by competent and experienced auditors or price analysts, or an engineer's estimate if comparison of the prices involved is insufficient.

If Community Transit does not have the capabilities to perform the needed analysis, the FTA will lend support in obtaining the services of the Defense Contract Audit Agency. Community Transit shall submit to the Federal Transit Administration (FTA) all data and analysis of the determination prior to award of the contract.

1.12 INELIGIBLE SUBMITTALS

In the event that a Contractor is on the Comptroller General's list of ineligible Contractors for federally financed or assisted work, their submission may be rejected and any contract resulting from their submission may be canceled, terminated or suspended by Community Transit. The U.S. Comptroller General's list of ineligible Contractors is available from the GAO Publications Branch, Room 6427, 441 G Street, Washington, DC 20548.

Community Transit reserves the right to reject any or all Proposals and to waive informalities and irregularities.

No Contractor may withdraw their Proposal after the time announced for submittal deadline or before the award and execution of the contract, unless the award is delayed for a period exceeding one hundred and twenty (120) days.

1.13 ADDENDA

Oral explanations or instructions given before the award of the contract shall not be binding. In order for information to reach Contractors before submission of their offers, any explanation desired by a Contractor regarding the meaning or interpretation of the solicitation document must be requested in writing no later than the date listed in Section 1.17, Time Line. Such information requests received via e-mail to the Procurement representative listed above will be

considered as a written request. Any information given to prospective Contractors concerning the clarification or any changes to the solicitation document shall be provided in writing to all prospective Contractors as an addendum of the solicitation

All proposed modifications found acceptable to Community Transit will be issued as an addendum and e-mailed or mailed to all potential Contractors. Only the addendum issued by Community Transit modifies the solicitation document. No other oral or written communication modifies the solicitation document.

1.14 ACKNOWLEDGMENT OF ADDENDA

Receipt of an addendum to this solicitation by a Contractor shall be acknowledged by signing and returning the addendum, if specified on the addendum. Such acknowledgment shall be submitted with the submittal package and received by Community Transit prior to the hour and date specified for receipt of submittal.

1.15 MODIFICATION OF SUBMISSION

Any modification of a submission already received will be considered only if the proposed modification is received prior to the time announced for the opening of the submittals. All modifications shall be made in writing, executed and submitted in the same form and manner as the original submittal.

1.16 JOINT VENTURE

Joint venture submissions will not be accepted by Community Transit. Contractors shall structure their submittals so only one Contractor is the *Primary Awardee*.

Other entities associated with the *Primary Awardee*, providing goods and/or services to Community Transit under this contract, shall be as a *subcontractor* to the *primary contract awardee*, not Community Transit.

1.17 REQUEST FOR EXTENSION

The Contractor agrees to supply, as soon as such data is available any reasonable proofs that are required by Community Transit to make a decision on any request for extension. Community Transit shall examine the request and any documents supplied by the Contractor and shall determine if the Contractor is entitled to an extension and the duration of such extension. Community Transit shall notify the Contractor of its decision in writing.

It is expressly understood and agreed that the Contractor shall not be entitled to damages or compensation and shall not be reimbursed for losses on account of delays resulting from any cause under this provision.

1.18 TIME LINE

Event	Date
Request for Proposals Published	August 14, 2007
Pre-Proposal Meeting**	August 29, 2007

Deadline for Final Questions	September 21, 2007
Proposal Due Date	2:00 PM, Friday, October 5, 2007
Contractor Interviews and Demonstrations*	Week of October 22, 2007
Award*	January, 2008

*Estimated dates – subject to change

**Pre-Proposal Conference at 10:00 AM
Community Transit
7100 Hardeson Road
Board Room
Everett, WA 98203

Proposals received until 2:00 p.m., October 5, 2007.

Each proposal shall remain open for a period of one hundred and twenty (120) days beginning after final proposal due date. Community Transit reserves the right to request an extension of the proposal effective period.

1.19 PRE-PROPOSAL CONFERENCE

There will be a pre-proposal conference at Community Transit's offices beginning at 10:00 AM, August 29, 2007. All Contractors are encouraged to attend the conference. If possible, questions should be submitted in writing three (3) working days prior to the conference to give staff time to research answers. No statements made during the conference shall serve to amend or modify this solicitation unless they are subsequently issued as a written addendum to this solicitation.

1.20 LIST OF MANDATORY FORMS AND DOCUMENTS

By submitting a response to this solicitation, Contractors agree to be bound by all legal requirements and contract terms and conditions contained in this solicitation document.

The following information, forms and documents contained in this solicitation shall be completed and submitted as the first section of the original **Proposal** document. Failure to include any of the requested information (Section 1) and properly completed forms and documents (Sections 4) may be cause for immediate rejection of the submittal. **Addenda to the request for submittals shall be signed and submitted with the other required documents in the submittal packet, if so required on the addendum, for the submittal to be considered responsive.**

1.	Financial Responsibility Package	Section 1.23
2.	Invitation To Submit Proposal	Section 4.00
3.	Certificate of Nondebarment/Suspension	Section 4.01
4.	Conflict of Interest Affidavit	Section 4.02
5.	Certification Regarding Lobbying by Contractor	Section 4.03

6.	Certification Regarding Lobbying by Subcontractor	Section 4.04
7.	Buy America Certification	Section 4.05
8.	Pricing Proposal **- MUST BE SUBMITTED UNDER SEPARATE COVER**	Section 4.06
9.	Proposal Contents • Executive Summary • Statement of Qualifications • Project Understanding • Technical Solution • Key Personnel • Project Experience and References • Exceptions (if applicable)	Section 1.19

1.21 ECONOMY OF PRESENTATION

All information must be submitted on 8 ½ x 11-inch wide bond paper, three-hole punched, and placed in three-ring binders. Text must be no smaller than 11-pt font, single-spaced. Figures may not incorporate text smaller than 8-pt font. All pages must be single sided with margins of one inch. Page numbering must be sequential.

Proposals that are unnecessarily elaborate beyond what is sufficient to provide a complete and effective response to this RFP are not desired and may be construed as an indication of the Contractor's lack of cost consciousness and ability to provide efficient work products. Elaborate artwork, expensive paper and bindings, and expensive visual or other presentation aids are neither necessary nor desired unless they contribute to the Community Transit's understanding of the proposal content.

1.22 SUBMITTAL CONTENTS

This section describes mandatory information that shall be included in the Proposal. Failure to address or include all of the items discussed in this section may subject the Proposal to immediate rejection. Community Transit will be the final authority in determining the responsiveness of Proposals. Community Transit requests that information be provided in the specific order listed to assist with the evaluation process.

All materials submitted become the property of Community Transit.

A. Executive Summary

Provide a summary of the key points of the Proposal including Contractor qualifications, technical solution, and similar projects recently completed that are of a similar scope and nature to the Community Transit Advanced Public Transportation System (APTS) Procurement. Provide a summary of the Contractor's experience with successfully delivering APTS for fixed route, paratransit, and bus rapid transit (BRT) services.

B. Statement of Qualifications

Provide a brief company description including size, along with an overview of relevant experience and qualifications in North America and worldwide. This shall take the format of a Statement of Qualifications.

If the Statement of Qualifications represents a joint effort on/or a prime/subcontracted Statement of Qualifications, provide the above for all members of the team and describe the specific organization and responsibilities of each project team firm.

C. Project Understanding

Provide a brief narrative demonstrating the submitter's understanding of the project requirements and local conditions.

D. Technical Solution

Provide a complete and comprehensive description of the proposed Technical Solution to meet the requirements of Section 2.0 of this RFP. This section shall include at a minimum:

1. A system overview/architecture describing the primary components/subsystems to be deployed, their relationships to each other, and their relationships to existing Community Transit systems.

2. Descriptions of each major subsystem proposed, including identification of specific components to be provided and how the Contractor proposes to meet the technical requirements associated with that subsystem.

3. A detailed description of the proposed 700MHz data radio system including confirmation that such system is compatible with the Contractor's other APTS components, will provide required throughput to accommodate Community Transit's communications requirements, and is compliant with Community Transit license provisions and FCC requirements with respect to operation in the 700 MHz frequency range.

4. Identification of any assumptions regarding work, services, or facilities to be provided by Community Transit.

5. A comprehensive description of the Contractor's proposed documentation, testing, training, and installation processes.

6. Sample reports or other technical (non-marketing) information included as an attachment that exemplifies data produced by the system or demonstrates user interfaces.

Proposals that primarily repeat back or simply acknowledge requirements may be considered non-responsive. The Contractor is responsible for describing how their proposed solution will meet the requirements stated herein, and shall demonstrate a full understanding of the work required.

E. Key Personnel

This section shall include a description of how the Contractor would staff the Community Transit project. Provide a resume for each proposed key project team member that includes their name, office location, current job title, and their specific work experience/ responsibilities on similar projects for the past five years (minimum). Include an organization chart delineating responsibilities of the proposed project team and their relationship to Community Transit's Project Manager. Key Personnel shall not be changed without the written approval of Community Transit. The Community Transit Project Manager and Community Transit staff will work primarily with the Contractor Project Manager, but shall have access to other key staff for technical questions and issues.

At a minimum, the Contractor shall identify the following key personnel:

1. **Contractor Project Manager.** The Project Manager shall have demonstrated APTS deployment experience, shall act as the primary interface with Community Transit's Project Manager, shall have the authority to assign staff and resources, shall have the ability to quickly respond to Community Transit requests and questions, and shall have the authority to make field decisions.

2. **Project Engineer.** The Project Engineer shall have primary responsibility for the development and delivery of the APTS.

3. **Lead Software Engineer(s)**. The Lead Software Engineer(s) shall have primary responsibility for software development, testing, integration, and configuration.

4. **Radio System Engineer.** The Radio System Engineer shall have primary responsibility for the design, installation, integration, testing, and commissioning of the data radio system, as well as for coordinating with other Community Transit radio system improvements being made under other contracts. The Radio System Engineer must have relevant experience with digital radio system implementation, and be knowledgeable regarding network integration and data messaging.

5. **Implementation Manager.** The Implementation Manager shall have responsibility for planning and coordinating all onboard and central site equipment installation, and shall oversee and certify all installation work. The Implementation Manager must have demonstrated experience installing the Contractor's equipment, and is required to be onsite in Snohomish County for the duration of all installation activities.

6. **Lead Trainer.** The Lead Trainer shall have primary responsibility for ensuring the quality of training materials, developing the training curriculums using effective training methodologies, coordinating training activities and content with Community Transit staff, and ensuring all other trainers are well qualified and prepared.

This section shall include a management plan that describes the method by which the Contractor proposes to administer and coordinate all work and employees on this project. The management plan shall include a proposed project schedule identifying key

milestone and delivery dates.

F. Project Experience and References

Include descriptions of six (6) to ten (10) projects similar in scope to the Community Transit APTS Procurement, including projects that cover fixed route bus services, paratransit services, bus rapid transit services, and data radio implementation and integration. The description of each project shall include: the name of the specific project, location and address of the project, summary of the project scope, photos of the project, the firm's specific role in project, the names of the firm's employee's that worked on the project and their role in the project, the total project cost, the date of project completion (or estimated completion), and material issues that arose and how they were resolved. Provide agency Project Manager contact names, addresses, phone numbers, and email addresses for each project listed.

From the projects identified above, the Contractor shall identify at least five (5) references that can be contacted (contact names, addresses, phone numbers, and email addresses) to confirm the Contractor's role and performance in the project, and performance of Contractor personnel. For each project reference, include the employee's name and the work performed by each member of the project team proposed for the Community Transit project.

G. Exceptions

Provide a section describing any proposed exceptions as provided for in 1.10. This section shall also identify any assumptions that the Contractor has that may affect the cost or performance of the work.

H. Price Proposal – MUST BE SUBMITTED UNDER SEPARATE COVER

The Contractor shall identify all project costs using the Price Sheet contained in Section 4.06. In the event that the Contractor identifies additional or optional system costs, such costs shall be identified on a separate sheet and included in this section. Community Transit reserves the right to adjust unit quantities up or down at the identified unit prices at any time prior to or after contract award.

Any and all exceptions, assumptions and qualifications regarding pricing shall be identified in **"G. Exceptions"**. Any qualifications, assumptions or exceptions added to the price sheet by the Contractor will not be considered or included in the contract.

The Pricing Proposal must be submitted separately, bound and sealed and clearly labeled as "Price Proposal". Pricing data must not be presented in any portion of the Technical Proposal.

1.23 FINANCIAL RESPONSIBILITY

The Contractor shall provide information demonstrating to Community Transit that it has the necessary financial resources to perform the contract in a satisfactory manner and within the specified time. Acceptable financial responsibility must be established by copies of audited financial statements, balance sheets, bank references, a recent submission to a recognized financial institution or similar document for each of the past three (3) years, and/or other related financial information that the Contractor deems relevant to the project.

If a Contractor deems such information to be confidential or proprietary in nature, the Contractor shall place this portion of its proposal in a separate envelope clearly and prominently marked "PROPRIETARY INFORMATION." Community Transit shall not disclose or reveal the contents of such separately designated proprietary information unless required to do so by law.

1.24 EVALUATION AND SELECTION PROCESS

This is a solicitation for the services described elsewhere herein. Each Proposal will be evaluated in accordance with the evaluation criteria stated herein to determine acceptable Proposals. The Board of Directors will award to the Proposer whose offer conforming to the solicitation is considered the most advantageous to Community Transit, as determined by the evaluation factors listed below. Community Transit reserves the right to select other than the lowest price Proposal.

Technical Selection Criteria and Considerations. The criteria outlined below will be used in evaluating the Proposals in the following order of priority:

1. **Project Understanding and Technical Solution.** This will be evaluated based on the Contractor's understanding of the project requirements, ability to meet the technical requirements, suitability of the proposed solution for Community Transit fixed route, paratransit, and bus rapid transit services, and data radio solution. (40 points)

2. **Qualification, Experience and References**. This will be evaluated based on the breadth and depth of the Contractor's relevant APTS experience and technical competence as a whole in the performance of comparable assignments, based on information contained in the Proposal and references from several clients where comparable work was performed. (30 points)

3. **Personnel Proposed.** This includes technical competence, past experience and education of key personnel related to similar projects previously conducted. (20 points)

4. **Project Organization and Management.** This will be based on the proposed approach to organizing, managing, and implementing the project. (10 points)

Price Section Criteria. Contractors considered to be within a competitive range technically based on the above referenced criteria will be further evaluated against proposed prices. CT reserves the right to select a Contractor based on a best value proposition that includes both technical and cost considerations. The lowest priced Proposal will not necessarily be selected, and any Contractors judged to lie outside of the competitive range technically may be judged non-responsive and not subject to further cost or other analysis. (40 points).

Evaluation and Negotiations. Based on the evaluation criteria, consisting of the combined technical and price ranking, a finalist or finalists may be selected for further evaluation and potential negotiations. There will be further evaluation through Contractor interviews and demonstrations of the top ranked proposer or proposers, the purpose of which will be to further discuss and understand the Contractor's proposed solution, and confirm the ability of the Contractor to meet stated requirements.

Contractors shall have key employees present at these interviews. Community Transit will notify the finalists as to the time and date for an interview, if applicable, and interviews will be held at Community Transit, 7100 Hardeson Road, Everett, WA 98203. Detailed instructions will be provided at that time, however Contractors should assume that they will need to:

1. Provide an overview of their understanding of the project and key steps required to successfully deliver the system.

2. Provide an overview of their staff qualifications, project management, and project experience, highlighting relevance to Community Transit.

3. Demonstrate their equipment and systems in integrated operation.

4. Describe their proposed engineering solution for the provision of the 700 MHz system, and integration with the APTS components and Community Transit's existing radio infrastructure and sites.

5. Identify any risks or considerations that Community Transit should be aware of based on the Contractor's experience with other projects.

An Evaluation Board consisting of Community Transit staff, Sound Transit staff, and the project Technical Consultant will conduct reference checks and assess the overall submittals and interviews, determining the shortlist and finalist.

1.25 AWARD OF CONTRACT

Upon completion of the evaluation process, Community Transit anticipates entering into negotiations with the preferred Contractor or Contractors with respect to the technical solution, cost, exceptions, implementation plan, and management plan. Upon completion of negotiations, the preferred Contractor or Contractors may be required to submit a "Best and Final Offer" that will form the basis for the ultimate contract award. The evaluation of the best and final offer will be on the same criteria as the original proposal.

The Board of Directors of Community Transit will make the final selection.

The formal acceptance by Community Transit of the Contractor's submittal shall be a Notice to Proceed issued by Community Transit. Prior to issuance of a Notice to Proceed, Community Transit will issue a notice of intent to issue and award a contract in writing, delivered in person or by mail. Such notice of intent to issue an award and contract shall obligate the Contractor to furnish all documents required by the Request for Proposals. Upon execution and submission of all required documentation, Community Transit will issue a Notice to Proceed evidencing its formal acceptance and award of the contract(s). Nothing in this section shall be construed to permit Contractors to alter its submittal after it has been submitted pursuant to the terms of the Request for Proposals.

Community Transit reserves the right to reject any or all Proposals and to waive informalities and minor irregularities in Proposals received.

RFP #50-07

ADVANCED PUBLIC TRANSPORTATION SYSTEM (APTS) PROCUREMENT

SECTION 2.0

TECHNICAL REQUIREMENTS AND SPECIFICATIONS

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2.01 PROJECT OVERVIEW

2.01.01 Introduction

As travel demand increases in the growing Puget Sound region, Community Transit continues to explore opportunities to provide better service and reach new riders as a way to help relieve increasing traffic congestion.

To that end, Community Transit is developing an Advanced Public Transportation Systems (APTS) project that will improve safety and customer service and help vehicles become more efficient. The project will implement a system of advanced electronics and communication technologies as well as management strategies that will improve Community Transit's ever-expanding operation.

Among the technologies included in APTS are:

- **Automatic Vehicle Locator (AVL):** This allows Community Transit's dispatch to track the movement of coaches and analyze their ability to stay on schedule and recognize obstacles preventing them from reaching stops in a timely manner. This feature also can communicate vehicle locations to police in an emergency.

- **Automatic Passenger Counters (APC):** These are devices that automatically count passengers as they board a coach. This information can help our schedule and route planners improve our service and reduce data collection and analysis time.

- **Automated Stop Annunciation (ASA):** This uses electronic reader boards and public address speakers onboard to announce the next stop along a route.

- **Computer-Aided Dispatch (CAD):** This technology helps improve the efficiency of operations, the speed of emergency response and the communication between Dispatch and operators. CAD will also support more efficient and effective data processing and real-time information for customers.

- **Advanced Traveler Information Systems (ATIS):** These include real-time traveler information displays and interactive voice response systems. Real-time travel information displays provide customers with real-time bus arrival information at transit shelters, onboard vehicles or to web-enabled mobile devices. Interactive voice response systems provide real-time bus arrival information and schedule and fare information through a touch-tone telephone.

- **Data Radios:** These will be used for data communications between vehicles and the central processing equipment in the Dispatch center.

- **Mobile Data Terminals:** These allow two-way communication between Dispatch centers and operators via a digital display and provide an on-board operations console for the operator that can include schedule or route changes as well as weather and traffic information.

Collectively, these enhancements will improve on-time performance and customer access to information while increasing efficiency through improved speed and reliability as well as fleet management.

This document is intended to define the minimum system features, requirements and capabilities desired by Community Transit to be deployed as part of the CAD/AVL/APC (Computer Aided Dispatch / Automatic Vehicle Location / Automatic Passenger Counter) system. The solutions proposed by Contractors must be similar to solutions provided by the Contractor to other transit agencies that have been proven for an operational period of at least six months. The desire of Community Transit is to promote well integrated and proven solutions that represent the current

state-of-the-art in transit agency fleet management, AVL, and ITS (intelligent transportation systems) deployments.

The following deployment objectives have been identified for the project:

1. Deploy an integrated automatic vehicle location (AVL), computer aided dispatch (CAD), and automatic passenger counter (APC) system to support Community Transit's fixed route and paratransit systems.

2. Have a fifteen-year service life.

3. Provide data communications using 700 MHz digital radio infrastructure and wireless 802.11 technology, considering the need to:

   - Provide comprehensive two-way data communications between Community Transit dispatch and vehicles throughout Snohomish County, and into Seattle and Bellevue in King County.
   - Support AVL, CAD, APC and other vehicle data transmission needs.
   - Comply with Federal Communications Commission (FCC) requirements.
   - Provide for a high degree of system reliability and continued Contractor support of system components.

   NOTE: The voice radio communications are on a separate dedicated system and are not intended to be impacted or integrated with this project.

4. Ensure that systems conform to National Intelligent Transportation System (ITS) Architecture and, where feasible, related Transit Communications Interface Profile (TCIP) standards.

5. Provide an interface to Community Transit's existing fixed route run-cutting software (HASTUS from GIRO, Inc.).

6. Provide an interface to import passenger manifests and trip changes from Community Transit's paratransit software system, Trapeze PASS v.4.71, into the CAD/AVL system as deployed for paratransit services.

7. Provide in-vehicle laptop tracking displays and mobile dispatching capabilities for selected managers' vehicles on a demonstration basis.

8. Provide interfaces to support connections to other regional ITS systems such as Sound Transit's regional traveler information system.

9. Support the deployment of real-time transit information on the Community Transit website and at displays at transit centers, Bus Rapid Transit stations, or other locations.

10. Provide data for off-line analysis, and support the transfer of data into archive, analysis, and reporting systems/software (legacy or otherwise).

2.01.02 Community Transit Overview

2.01.02.01 SERVICE AREA

Community Transit's 1,297-square-mile service area includes both urban and rural areas of Snohomish County. Community Transit also operates service extending into neighboring King County. Service includes:

- A network of local routes extending throughout the urban and suburban areas of Snohomish County.
- Rural routes including service to Darrington and the US 2 (Stevens Pass Highway) corridor.
- Commuter service to Downtown Seattle, the University of Washington, and Redmond.
- Regional "Sound Transit Express" routes to Seattle and Bellevue, provided by Community Transit under contract with Sound Transit.
- A new Bus Rapid Transit (BRT) service that will run between the Everett Station and the Aurora Village Transit Center.

2.01.02.02 REVENUE FLEET

Community Transit's current and near-term fleet that will be equipped through this procurement is as follows. Fleet size is subject to change, and Community Transit reserves the right to adjust equipment quantities to meet actual fleet requirements at the time of implementation:

1. Community Transit Fixed Route Fleet (275 coaches total) consisting of:

- Community Transit Local 30': 48 coaches
- Community Transit Local 40': 95 coaches
- Community Transit Local 60': 41 coaches
- Community Transit Express 40': 21 coaches
- Community Transit Express 60': 70 coaches

2. Bus Rapid Transit Fleet (14 coaches total)

3. Sound Transit Express Fleet (47 coaches total) consisting of

- Sound Transit 40': 27 coaches
- Sound Transit 60': 19 coaches
- Double-decker: Community Transit currently has 1 double deck coach (referred to as a "double tall" coach), and is considering the possibility of purchasing additional coaches in the future.

4. Paratransit Fleet (55 paratransit vans total)

5. Manager Non-Revenue Vehicles (2 vehicles total on a demonstration basis)

2.01.02.03 OPERATING FACILITIES

The fixed route operation has two bases:

1. Merrill Creek Operating Base (coaches operated directly by Community Transit). This facility is located at 7100 Hardeson Road, Everett, WA 98203, and is also the location of the administrative offices and data center.

2. Kasch Park Operating Base (Community Transit Commuter and Sound Transit Express service operated by First Transit). This facility is located at 2300 Kasch Park Road, Everett, Washington, 98204.

The Dial-a-Ride-Transportation (DART) operating facility is located at 8225 44th Avenue West in Mukilteo. DART is operated by Senior Services of Snohomish County.

Dispatch facilities are located at Merrill Creek (Community Transit dispatch), and Kasch Park (First Transit dispatch), and at the 44th Avenue West facility in Mukilteo (Dial-a-Ride-Transportation/ paratransit dispatch). Head-end radio communications infrastructure is located at Kasch Park, with radio repeater sites located at various sites to provide communications in Snohomish and King Counties.

2.01.02.04 PASSENGER FACILITIES

Community Transit's passenger facilities include:

- Transit centers
- Park & ride facilities
- Bus stops including stops at multi-modal facilities such as ferry terminals
- BRT Stops/stations

2.01.03 Radio System Overview

2.01.03.01 EXISTING VOICE RADIO SYSTEM

The voice communication needs of the Community Transit fixed route fleet are now served by an existing 6-site, 4-channel 800 MHz simulcast conventional radio system licensed under call signs WNRN975 and WPMV943. The existing voice radio system has three sites in Snohomish County (Frailey Mountain, Mt. Pilchuck, and Gunnysack Hill); one site in Island County (the Heggness Road Pinnacle site near Clinton on Whidbey Island); and two sites in King County (Tiger Mountain and Queen Anne Hill). The Mt. Pilchuck site will be replaced with a new site at Gunsite Ridge, and all of the existing 800 MHz radio equipment now at the Mt. Pilchuck site will be moved to the Gunsite Ridge site under a separate project.

This existing 800 MHz system will continue to be used to provide voice communications throughout the Community Transit service area (see Attachment 1). The two new 700 MHz 25 kHz narrowband channels described in the next section will be used to provide data communications with both fixed route and paratransit vehicles and to enable advanced CAD/AVL functionality for the entire Community Transit fleet.

The four 800 MHz channels now licensed to Community Transit are:

- 852.5875 MHz (Community Transit Channel 1)
- 851.8375 MHz (Community Transit Channel 2)
- 853.3375 MHz (Community Transit Channel 3)
- 866.1875 MHz (Community Transit Channel 4)

These four channels will continue to be used to provide voice communications to the transit fleet operated by Community Transit, with two channels used for dispatch communications with Community Transit's fixed route fleet, one channel used for voice dispatch communications with the vehicles operated through downtown Seattle by Community Transit's contractor, First Transit, and one channel for voice communications by supervisors and maintenance personnel.

The new 700 MHz data radio system will operate independently from the existing voice radio system, as described in the following sections.

2.01.03.02 700 MHZ DATA RADIO CHANNELS

Community Transit is in the process of licensing two 25 kHz channels taken from two of the twenty 700 MHz 25 kHz narrowband channel blocks allocated to Snohomish County in the Regional Plan for the Public Safety 700 MHz Band in Region 43 ("Region 43 700 MHz Plan"), as approved by the FCC on June 27, 2006.

The two 700 MHz channels will be licensed at all six (6) Community Transit sites. The initial build out of the 700 MHz data system will include the Gunsite Ridge site, which will replace the existing Mt. Pilchuck site. Because the existing Community Transit voice radio system has sites located in three different counties, it was necessary to evaluate all of the available channels assigned to Snohomish County in the Region 43 700 MHz Plan to determine which channels could be used with the least risk of interference to future adjacent channel systems in the Counties in Western Washington adjacent to Snohomish County and King County. The two channel blocks which were determined to be most appropriate for use by Community Transit are listed below:

Channel	Base Frequency	Mobile Frequency
669-672	774.187500	804.187500
837-840	775.237500	805.237500

Community Transit is currently licensing a single 25 kHz data channel in each of these 25 kHz channel blocks. The center frequencies of those 25 kHz channels are:

Channel	Base Frequency (Center of 25 kHz Block)	Mobile Frequency (Center of 25 kHz Block)
669-672	774.187500	804.187500
837-840	775.237500	805.237500

The use of these specific frequencies, along with a system design which limits the "footprint" of the proposed Community Transit 700 MHz subsystem outside the intended service area, and which essentially matches the coverage footprint of the existing voice radio system, is intended to preclude the potential for interference to other currently proposed and future 700 MHz systems in Western Washington.

Both of the channel blocks shown above are designated as U.S. Primary blocks in the *Sharing Arrangement Between the Department of Industry of Canada and The Federal Communications Commission of the United State of America Concerning the Use of the Frequency Bands 764 to 776 MHz and 794-806 MHz by the Land Mobile Service Along the Canada-United States Border ("700 MHz Sharing Arrangement")*. Therefore, there are no Canadian border protection requirements associated with the use of these channels in the system proposed by Community Transit.

In the data system infrastructure required under these Specifications, the particular channel and repeater site to be used to communicate to a particular vehicle must be selected automatically by the data system's network control infrastructure. This form of automatic channel and site selection is essentially equivalent to "trunked" operation in a voice radio system. §90.537 of the Commission's Rules requires systems that use more than six 6.25 KHz channels to be licensed for trunked operation. Because the system will use the equivalent of eight narrowband 6.25 kHz channels if the system employs two channels with a 25 kHz bandwidth or if the system employs four 12.5 kHz channels, Community Transit's license specifies an SY (Trunked Public Safety 700 MHz) radio service code as required by §90.537.

If the radio equipment ultimately selected for use in the system uses a 12.5 kHz data channel bandwidth, the two channels will be relicensed to use either the upper 12.5 kHz channels or both

12.5 kHz channels in each of the two 25 kHz channel blocks listed above, depending upon the radio system site/channel configuration proposed by the Contractor. The radio service code on the license may be modified to reflect conventional operation, which is allowed for systems using bandwidth equivalent to fewer than six 6.25 kHz channels if only two 12.5 kHz channels are used. Any modification of Community Transit's 700 MHz FCC license required by the use of 12.5 KHz radios shall be Community Transit's responsibility.

The center frequencies of the upper 12.5 kHz channels in each block are listed below:

Channel	Base Frequency (Upper 12.5 KHz)	Mobile Frequency (Upper 12.5 kHz)
669-672	774.193750	804.193750
837-840	775.243750	805.243750

The center frequencies of the lower 12.5 kHz channels in each block are listed below:

Channel	Base Frequency (Lower 12.5 KHz)	Mobile Frequency (Lower 12.5 kHz)
669-672	774.181250	804.181250
837-840	775.231250	805.231250

2.01.03.03 BASE STATION SITES

The current Community Transit voice radio system is configured as a six-site radio system with main base station repeater sites located at the following sites:

At each site, the existing 800 MHz repeater base stations are connected to Community Transit's dispatch facilities via a 900 MHz fractional T1 microwave interconnect system. Prior to the implementation of the new 700 MHz data radio system, this existing microwave system will be replaced with a new licensed microwave system in the 6 GHz, 10 GHz and 18 GHz bands with a minimum of 4 T1 paths and a maximum of 8 T1 paths from Community Transit's Kasch Park facilities to each base station repeater site. The new microwave system will provide voice and data paths for both the existing voice radio system and the new 700 MHz data radio system. At least one of the 4 T1s allocated to each remote site is reserved for use for interconnection of the new transit data system. The remote site paths are all licensed for 8T1 capacity; the capacity can be divided between the required number of T1s and 10BaseT interconnections by software settings in the Harris TRuepoint radios.

The FCC license data for the existing sites is as follows:

Site Name	**Latitude**	**Longitude**	**Elevation (AMSL)**	**Antenna Ht. (AGL)**	**800 MHz ERP (W)**
Frailey Mountain	48-18-08.0 N	121-59-18.5 W	803.8 m	48.8 m	220
Mt. Pilchuck	48-04-03.4 N	121-49-37.5 W	901.0 m	24.0 m	100
Clinton (Heggness Road) ASR# 1222658	47-57-05.7 N	122-21-57.0 W	150.0 m	25.6 m	200
Gunnysack Hill ASR# 1228601	47-51-40.3 N	122-17-06.5 W	194.0 m	22.0 m	220

Tiger Mountain	47-30-13.4 N	121-58-32.4 W	899 m	43.0 m	100
Queen Anne Hill	47-37-48.7 N	122-21-23.0 W	105 m	29.9 m	50

Prior to implementation of the new 700 MHz data radio system, the Mt. Pilchuck site will be replaced with a site, west of Mt. Pilchuck at Gunsite Ridge, and the existing Tiger Mountain site will be replaced by a site on a different tower within the same communications compound atop Tiger Mountain. The geographic, elevation and ERP (Effective Radiated Power) data for these sites, which will be the sites used in the new 700 MHz data radio system, are shown in the table below:

Site Name	Latitude	Longitude	Elevation	Antenna Ht.	700 MHz ERP (W)
Frailey Mountain	48-18-08.0 N	121-59-18.5 W	803.8 m	48.8 m	220
Gunsite Ridge	48-03-03.6 N	121-51-43.2 W	711.7 m	27 m	200
Clinton (Heggness Road) ASR# 1222658	47-57-05.7 N	122-21-57.0 W	150.0 m	25.6 m	200
Gunnysack Hill ASR# 1228601	47-51-40.3 N	122-17-06.5 W	194.0 m	22.0 m	220
Tiger Mountain ATC	47-30-14.6 N	121-58-30.6 W	899 m	19.8 m	200
Queen Anne Hill	47-37-48.7 N	122-21-23.0 W	105 m	29.9 m	50

All six of these sites will be used in the data radio system conceptual design identified in this Specification. Community Transit has existing site and tower lease arrangements at these sites. Because the number of high elevation sites suitable for wide-area coverage in Snohomish and King Counties and with available space is limited, because these sites have known propagation and coverage characteristics, because the new microwave interconnect system being implemented to support both the voice and data radio systems used by Community Transit provides connectivity to these sites, and because it would be very difficult to obtain permitting and leases for additional new sites in a timely enough fashion to maintain Community Transit's system implementation schedule, these sites are strongly preferred for any proposed radio system configuration.

If base station sites other than those in the conceptual design are proposed, the Contractor shall also propose to perform all necessary work to locate and acquire (arrange site leases) the sites for Community Transit. Contractor shall supply power, license, equip, and contract the additional site(s) as necessary per Contractor's radio system design and per these Specifications.

2.02 SCOPE OF WORK

A. Advanced Public Transportation System (APTS) equipment shall be installed on the entire Community Transit revenue fleet, including fixed-route and paratransit vehicles, new BRT vehicles, and vehicles operated under Sound Transit livery.

B. The objective of this project is to supply, install, commission, and integrate a fixed route transit and paratransit vehicle management system including fixed-route and paratransit CAD/AVL systems, remote CAD terminals for manager vehicles (on a demonstration basis), an APC system, traveler information and communication systems, and data management and export systems.

C. One hundred percent of the fixed-route fleet shall be equipped with APC.

(1) All Community Transit fixed-route coaches have two doors except Community Transit Local 30' coaches, which only have one door.

(2) The new BRT vehicles will have three doors.

D. Work elements shall include.

*(1) Fleet-wide deployment of an **On-Board System** on the entire Community Transit fleet, including fixed-route and paratransit vehicles, future BRT vehicles, non-revenue vehicles, and vehicles operated under Sound Transit livery. (The fixed-route, paratransit, supervisory, and non-revenue vehicles will require different sets of equipment as detailed in Section 2.06.)*

*(2) Deployment of a **Central System** including a computer-aided dispatch system for use by Community Transit (at the Merrill Creek Operating Base), by contracted service operators (at the Kasch Park Operating Base), and by Community Transit's paratransit service (also contracted, located at 8225-44th Ave. W., Mukilteo).*

*(3) Implementation of a new **Traveler Information System** providing real-time transit information via electronic next bus signs, an interactive web site, and an optional IVR (Interactive Voice Response) phone system.*

*(4) Deployment of a new and upgraded **Communication System** integrating the On-Board System and Central System via a new 700 MHz data radio network, a Wireless Local Area Network (LAN), and other communication links.*

E. These items must operate in a fully integrated manner, and must external interfaces to other systems as described herein. In addition, the deployment shall allow for expansion over time, including increases in the number of vehicles or dispatchers, and the addition of enhanced or improved functionality.

2.02.02 Complete System

A. It shall be the responsibility of the Contractor to bid a complete system and provide all equipment, hardware, software and services necessary to ensure a fully functioning system as described by this specification. This requirement includes any permits, authorizations, inspections, designs, and/or other activities necessary to install any equipment on Community Transit vehicles or at Community Transit facilities. This also includes any additional communications backhaul or licensing needs. Community Transit will reasonably assist the Contractor in obtaining the required clearances, but this will not in any way absolve the Contractor from providing a complete and operational system that meets the requirements identified in this document.

2.02.03 Project Schedule

A. An overall project schedule is illustrated below. As part of its Proposal, the Contractor shall provide a detailed project schedule that assumes a mid-January, 2008 Contract Award date.

Task	1st Quarter 2008	2nd Quarter 2008	3rd Quarter 2008	4th Quarter 2008	1st Quarter 2009	2nd Quarter 2009	3rd Quarter 2009
Preliminary Design							
Final Design							
Installation							
Testing							
Training							

B. The Contractor shall indicate in its Proposal a separate sub-schedule illustrating and committing to the following dates related to Community Transit's Bus Rapid Transit (BRT) implementation, scheduled to be in-service in June, 2009:

(1) Supply of equipment material lists, wiring diagrams, installation instructions and shop drawings for all equipment to be installed on BRT vehicles no later than May, 2008 (as part of the Preliminary Design Review submission). This information will be provided to Community Transit's BRT coach supplier (New Flyer).

(2) Supply of all BRT-related onboard equipment to the coach supplier for installation as original equipment no later than the end of August, 2008.

(3) Installation, testing and commissioning of the central site hardware and software, communications links, and roadside signs at BRT stops as required to provide an operational APTS for the BRT service no later than the beginning of May, 2009.

(4) Completion of all BRT-related operator training (train-the-trainer) sessions by the end of March, 2009, and completion of all other training necessary for BRT operation by the end of April, 2009.

2.03 PROJECT MANAGEMENT

2.03.01 Project Management and Staffing

A. The selected Contractor shall provide staff and Key Personnel as identified in *Section 1.0, Solicitation Instructions and Requirements*.

B. All on-site Contractor staff and Subcontractors shall report to the Project Manager who shall have full control over all schedules, staff and on-site decisions.

C. The Contractor Project Manager shall be present at all project meetings and shall be fully responsible for the management of the project from inception to completion.

D. The Contractor Project Engineer shall be available, in person or by teleconference,

for all project meetings and specialty technical meetings.

E. Contractor key technical, documentation, training and other staff shall be available in person or by teleconference, as appropriate, to discuss specific items as needed.

F. Project management shall be an ongoing and continuous service provided by the Contractor to ensure that Community Transit requirements are met in terms of functionality, schedule and within the proposed cost.

2.03.02 Coordination of Work

A. The Contractor shall coordinate all work done by Subcontractors. Any communication between Community Transit and the Subcontractors shall be done through the Contractor.

B. The Contractor shall coordinate all on-site work and access with Community Transit. All access is subject to approval by Community Transit.

C. The Contractor shall minimize downtime to existing resources, prevent any negative impacts on the existing operating systems, and provide for a smooth and secure transition to use Community Transit equipment.

D. The Contractor shall ensure that all points of interface have been investigated well, and all technical risks addressed. The Contractor shall ensure that dispatchers, vehicle operators, system maintainers, and planning staff and system administration staff have been trained on the operation of the systems, as well as briefed on how the systems will change their job responsibilities and enhance their ability to perform their jobs efficiently.

2.03.03 Schedule and Progress Monitoring

2.03.03.01 SCHEDULE

A. The Contractor shall prepare a master schedule of work to be submitted 30 calendar days following Notice to Proceed.

B. The schedule shall include milestone dates for all interfaces, availability and requirements that are to be delivered by or to a third party. For example, the timing for all data requirements for facility availability, power/communication availability, training etc. should be clearly identified.

C. A separate sub-schedule illustrating activities, milestones and progress related to APTS implementation for the BRT service shall be included and maintained as part of the master schedule.

D. The schedule shall be updated by the Contractor on a monthly basis to reflect the progress attained in the previous month and the anticipated changes in the future.

E. As part of the monthly reporting, the Contractor shall report on all delays from the original schedule, and shall identify actions that can be taken to recover schedule delay. In the event that any activity is delayed for more than ten (10) days from the original schedule, the Contractor shall submit a schedule recovery plan.

2.03.03.02 PROGRESS REPORTS

A. The Contractor shall provide monthly status reports during system installation and system testing, detailing current progress, percent of project completion, any Subcontractor work, and problems encountered.

B. During the Warranty period, the Contractor shall provide written reports on an as-occurring basis, documenting any unusual system events.

2.03.03.03 PROGRESS MEETINGS

A. The Contractor shall participate and take minutes of regular progress review meetings, such as:

(1) Monthly, or as required, design/contract review meetings with Community Transit; and

(2) Technical progress meetings as required.

B. Other meetings with Community Transit and its consultants shall be undertaken on an as-required basis. Such meetings shall be called at the discretion of Community Transit. The Contractor may also request meetings that will be subject to the approval of Community Transit. Contractors should be aware that project meetings might occasionally be held at locations other than Community Transit offices. These may include the Contractor's facility or consultant facility.

2.03.04 Invoicing and Payment

A. The Contractor may invoice for payment milestones completed upon acceptance by Community Transit of all work associated with the milestone.

B. For each payment milestone (with the exception of the Final Acceptance and Warranty Milestones, Community Transit shall withhold ten percent (10%) of the milestone payment amount. Such withheld amounts shall be released upon satisfactory completion of the Final Acceptance milestone.

C. Payment milestones and amounts shall be as follows:

PAYMENT MILESTONE	PERCENT PAYMENT OF CONTRACT AMOUNT
Acceptance of Project Schedule	5%
Acceptance of Preliminary Design	10%
Acceptance of Final Design	10%
Acceptance of Factory Acceptance Testing	10%
Supply, Installation, Commissioning of all Data Radio Base Station Components	5%
Supply, Installation, and Commissioning of all Roadside APTS Components	5%
Supply, Installation and Commissioning of all Mobile (onboard) Components	15%

Supply, Installation and Commissioning of all Central and Transit Base Components	10%
Acceptance of System Integration Testing	5%
Acceptance of Training	5%
Acceptance of System Acceptance Testing	10%
Acceptance of Warranty	10%

D. In the event that the contract amount is revised as a result of an approved change order, the amount of payments shall be adjusted in accordance with the above noted percent payments.

E. Payments or credits related to an approved change order related to milestones completed prior to execution of the change order shall be due and payable at the next scheduled milestone.

2.03.05 Quality Assurance and Control

A. The Contractor shall provide a quality plan identifying their internal processes for the creation and review of deliverables including parties responsible and the respective time frames.

2.04 ENGINEERING

2.04.01 System Design Process

A. The Contractor shall conduct two formal design review meetings (with each extending over multiple days as needed): Preliminary Design Review and Final Design Review. These reviews shall be conducted to evaluate the progress and technical adequacy of the design and compatibility with the requirements of the contract.

B. The Contractor shall establish a design review schedule. The initial schedule shall be tentative and shall be updated as necessary to provide a minimum notice of thirty calendar days for each scheduled review.

C. At least twenty-one calendar days prior to a scheduled review, the Contractor shall submit a System Design Document (SDD). The Contractor may submit design review material incrementally, however a complete listing and submittal of each section of the System Design Document shall be provided at least twenty-one days in advance of the meeting. Each section of the System Design Document shall contain version control numbers and revision dates.

D. The review shall be conducted on mutually agreeable dates at Community Transit facilities in Everett, Washington. The Contractor shall provide design review personnel with technical competency and knowledge in all subject areas reviewed.

E. The Contactor shall employ human factors and industrial design principles for equipment and user interface design.

2.04.01.02 PRELIMINARY DESIGN REVIEW (PDR)

A. The preliminary design review shall be held approximately twelve (12) weeks after Contract Award.

B. The preliminary design review shall be held to confirm basic system functionality and conformance with the contract. The preliminary design review shall also be used to solicit Community Transit input on system engineering and design.

C. The preliminary design review shall represent approximately 50-70% completion of the total engineering work. Documentation shall be provided at a first draft or preliminary level.

D. The System Design Document issued in both hard copy and electronic format at PDR shall include at a minimum:

(1) Schedule compliance and discussion of variances or delays.

(2) An overall system architecture identifying functional blocks, distribution of major processes, and data and information flows.

(3) National ITS Architecture diagrams to the equipment package level.

(4) Flowcharts, diagrams, and supporting text describing major system processes. Major software applications shall be described in detail, especially where custom processing algorithms are to be provided.

(5) Functional and physical descriptions of all proposed hardware elements.

(6) Preliminary user interface information and drawings, flow charts, messages and menus.

(7) Description of all system security features.

(8) Preliminary equipment mounting arrangements, dimensions and installation requirements. The Contractor shall include with this initial estimates of installation time.

(9) Preliminary data model describing entities, attributes, data dictionary and meta data.

(10) Communications system architecture described graphically and in text, along with descriptions of the transmission mediums to be used, capacity utilization, speed, and expected reliability and availability.

(11) Hardware and software interfaces with other Community Transit systems, as well as a complete description of the inter-relationships of Contractor supplied hardware and that of Community Transit.

(12) Listing of special tools and software requirements.

(13) Summary of human factors and industrial engineering results.

(14) System backup and recovery procedures.

(15) Software design descriptions (top level of software documentation) for microprocessor-based or programmable equipment.

(16) Preliminary report structure and content.

E. Preliminary design review material shall also include annotated outlines of all

manuals, training materials and other system and operational documentation.

F. Within fourteen days of the preliminary design review, the Contractor shall prepare and issue a summary of all design review items arising from the meeting. The summary shall also include any items transmitted by Community Transit separately up to seven days after the meeting. The Contractor shall indicate proposed actions to resolve outstanding design items. Such actions may include:

(1) No further action required. This shall be accompanied either by a note that this was agreed to at the meeting, or by an explanation/justification by the Contractor.

(2) To be revised for Final Design Review.

(3) Outstanding issue for resolution. This shall be accompanied by a description of the issues, options for resolution, and process for resolution.

G. All issues and proposed actions/resolution are subject to approval by Community Transit.

2.04.01.03 FINAL DESIGN REVIEW (FDR)

A. The final design review shall be held approximately four to six (4-6) weeks after the summary of the Preliminary Design Review has been issued.

B. For the final design review, the Contractor shall furnish Community Transit with updated (from the preliminary design review) and complete written documentation describing the system to be delivered including all equipment and software to be furnished. The System Design Document (SDD) shall include, as a minimum, the following information:

(1) Overall system schematic and architecture;

(2) Major assumptions and risks;

(3) Detailed description of all sub-systems and equipment and hardware, including functional description, interface descriptions, communications loading details, material specifications (i.e. environmental, electrical etc), Material Selection Documentation (MSD), configuration details and installation details;

(4) Description of how the system deals with a loss of communication, including what happens to the data and what is visible through the GUI (Graphical User Interface) for the software;

(5) Details on all network, data, power/electrical or other requirements provided by a third party;

(6) Detailed description of all software, including functional description, system interface descriptions, Graphical User Interface descriptions, hardware specifications, availability and reliability figures and configuration details;

(7) Detailed description of the information style and content that will be disseminated to the public, including but not limited to, VMS (Variable Message Sign) message sets, IVR structure and content, web site style, content and organization, and how the web site shall address ADA (Americans with Disabilities Act) requirements for accessibility;

(8) Detailed descriptions of information, materials, and timing required by the

Contractor of other parties; and

C. The final design review shall be conducted when the design for the system is substantially complete, just prior to production drawing and software specification release. This shall represent approximately 90% completion of the engineering work.

D. The final design review shall determine that the detail design of the subsystem under review will satisfy the design requirements and establish the exact interface relationships between the subsystem and equipment or facilities.

E. Final design review materials shall include in both hard copy and electronic format a draft final (90% complete) version of the Systems Design Specification, including at a minimum:

(1) Schedule compliance and discussion of variances or delays.

(2) Final system architecture identifying functional blocks, distribution of major processes, and data and information flows.

(3) National ITS Architecture diagrams to the P-Spec level.

(4) Final flowcharts, diagrams, and supporting text describing major system processes. Major software applications shall be described in detail, especially where custom processing algorithms are to be provided.

(5) Listing of all third party software to be provided including version number and license information.

(6) Detailed hardware functional and physical descriptions including dimensions, weight, power and environmental requirements.

(7) Detailed user interface information and drawings, flow charts, messages and menus.

(8) Updated description of all system security features.

(9) Final equipment mounting arrangements, dimensions and installation requirements including all bracket and mounting hardware design. Design work related to this will require input and review from, and coordination with, Community Transit Vehicle Maintenance. The Contractor, with input from Vehicle Maintenance and OEM's (Original Equipment Manufacturers), shall provide final estimates of installation time and shall prepare detailed installation procedures. Approval is required from Vehicle Maintenance on all designs.

(10) Final data model describing entities, attributes, data dictionary and meta data.

(11) Final communications system architecture described graphically and in text, along with descriptions of the transmission mediums to be used, capacity utilization, speed, and expected reliability and availability.

(12) Final hardware and software interfaces with other Community Transit systems. Each interface shall be described in a unique interface control document (ICD) describing all associated electrical, data and security elements and structure of the interface.

(13) Final listing of special tools and software requirements.

(14) Updated summary of human factors and industrial engineering results.

(15) Final system backup and recovery procedures.

(16) Final report structure, content and format.

F. Final design review material shall also include draft versions of all manuals, training materials and other system and operational documentation. Final versions shall be submitted as part of "as-built" documentation.

G. Within fourteen days of the final design review, the Contractor shall prepare and issue a summary of all design review items arising from the meeting. The summary shall also include any items transmitted by Community Transit separately up to seven days after the meeting. The Contractor shall indicate proposed actions to resolve outstanding design items. Such actions may include:

(1) No further action required. This shall be accompanied either by a note that this was agreed to at the meeting, or by an explanation/justification by the Contractor.

(2) To be revised prior to system production and/or software development.

(3) Outstanding issue for resolution. This shall be accompanied by a description of the issues, options for resolution, and process for resolution.

H. All issues and proposed actions/resolution are subject to approval by Community Transit.

2.04.02 Submittals

2.04.02.01 GENERAL

A. Unless otherwise indicated, five (5) paper copies and one (1) CD-ROM or DVD-ROM copy of all submittals shall be provided. Community Transit shall have the right to reproduce all submittals as required for internal and consultant distribution and system operation.

2.04.02.02 DATA RADIO SYSTEM SUBMITTALS

A. The Contractor shall provide the following radio system technical data:

(1) Coverage maps, in both hard copy and GIS (Geographic Information System) format, showing the entire Community Transit service area and highlighting those areas with predicted coverage that meets the received signal strength requirements shown in Section 2.12.02.04, based on the Contractor's system design.

(2) Effective 12 dB SINAD (Signal Including Noise And Distortion) receiver sensitivity at the input to each base station receiver (including the effects of gains and losses in receiver multicouplers, tower-top preamplifiers, and other equipment installed between each receiving antenna and its associated base station receivers).

(3) Base station transmitter power delivered to the transmission line for each transmitting antenna, after combiner losses.

(4) Rated output power of all fixed site and mobile radios.

B. The Contractor shall provide radio system as-built drawings and documents including the following:

(1) Block and level diagrams

(2) Equipment installation drawings, including floor plan and rack elevation diagrams for each remote radio site.

(3) Device interconnections, including cable labeling and punch-block termination labeling

(4) Recommended settings for all adjustable devices and equipment, with explanations of the settings

(5) Test record sheets, with results of tests performed

(6) An additional copy of the as-built drawing(s) shall be stored inside the appropriate enclosures at each radio site, preferably on the door of the enclosure.

2.04.02.03 MATERIAL SELECTION DOCUMENTATION (MSD)

A. For custom-manufactured equipment, the Contractor shall submit a set of comprehensive shop drawings and specifications as part of the MSD. The comprehensive shop drawings shall include the general arrangement, layout, wiring details, mounting bolt requirements, location for conduit entry and any physical or electrical requirements.

B. For standard off-the-shelf items, the Contractor shall submit detailed manufacturer product specifications, drawings on mounting requirement, location of conduit entry and any other physical or electrical requirements.

C. The Contractor shall provide certification and compliance statements for all standards that apply to the manufacturing of the equipment, whether custom-manufactured or off-the-shelf.

2.04.02.04 INSTALLATION MANUALS

A. The Contractor shall provide five (5) installation manuals for each type of unit provided unless specified otherwise. The manuals shall provide sufficient detailed installation and maintenance instructions to allow Community Transit or its representative to properly and safely install, connect and commission the equipment supplied.

B. The Contractor shall also provide all details of connectors and interconnect cables to Community Transit or its representative.

2.04.02.05 TRAINING MANUALS

A. Training manuals shall be provided for each training participant, in addition six (6) additional copies shall be provided. The manuals shall provide information on all of the topics covered during each of the training sessions and include exercises and screen captures. The Training Manual shall include space for the users to take notes during the training sessions.

B. The Training Manuals shall be provided at the initiation of each training session.

2.04.02.06 TEST DOCUMENTATION

A. Testing documentation shall be submitted as described in Section 2.12.

2.04.02.07 AS-BUILT DOCUMENTATION

A. The Contractor shall provide sufficient documentation to reflect "as supplied" conditions and to facilitate operation, maintenance, modification and expansion of the equipment or any of its individual components to the satisfaction of Community Transit or its representative.

B. The SDD shall be updated to include the as-built conditions.

C. The as-built documentation shall be provided three weeks after the System Acceptance Test (SAT), and updated documentation will be required at any time the Contractor provides software or hardware upgrades.

2.04.02.08 OPERATION AND MAINTENANCE DOCUMENTATION - GENERAL

A. The operation and maintenance documentation shall be comprised of the Operation and Maintenance (O&M) manuals, User Manuals and System Administration Manuals.

B. The operation and maintenance documentation shall be developed interactively with Community Transit staff, and the Contractor should expect multiple iterations.

C. As part of the Preliminary Design Review, the Contractor shall provide example operation and maintenance documentation from other, similar projects, indicating elements that are or are not applicable to Community Transit, and indicating areas of the operation and maintenance documentation that require creation or substantial revision to reflect Community Transit requirements.

D. At the Preliminary Design Review, the Contractor shall conduct interactive workshops using demonstration equipment to “walk through” operation using the information provided. The Contractor shall also further develop operation and maintenance documentation to meet Community Transit needs for operations, training and maintenance.

E. At the Final Design Review, updated operation and maintenance documentation shall be provided, and further workshops conducted to revise and update the documents.

F. Final operation and maintenance documentation shall be submitted to Community Transit no later than seventy-five (75) days prior to deployment of the system in revenue service to support training requirements.

G. The Contractor shall deliver fifteen (15) complete sets of operation and maintenance documentation.

2.04.02.09 O&M MANUALS

A. The O&M manuals shall be a detailed presentation and shall include illustrations where applicable. For each unit, it shall include, but shall not be limited to:

(1) General description;

(2) Functional descriptions;

(3) Functional block diagram;

(4) Operating instructions;

(5) Maintenance and repair procedures;

(6) Test procedures;

(7) Schematic drawings and circuit diagrams; and

(8) Parts list;

B. Each type of maintenance manual shall contain but not be limited to:

(1) Description of operation including start-up, shut-down and emergency procedures;

(2) Installation procedures;

(3) Complete parts identification diagram and list;

(4) Troubleshooting procedures;

(5) Inspection procedures;

(6) Preventive maintenance procedures and program;

(7) Repair procedures;

(8) Diagnostic procedures including criteria for equipment swap-out;

(9) Wiring diagrams;

(10) Electrical schematics with board and cable identification;

(11) Adjustment procedures;

(12) Seasonal maintenance requirements;

(13) Equipment arrangement and drawings;

(14) Names and schedules of all lubricants and cleaners used; and

(15) Other consumable materials for the equipment stating where used, quantity, service intervals and annual consumption.

C. The Contractor shall provide a subassembly list for each piece of equipment supplied. The subassembly list shall identify the manufacturer(s), model/part number, address and contact information.

D. The Contractor may use manufacturer's data and handbooks for individual items of the equipment that are a sub-component of the overall system. All such documentation shall be contained in similar binders.

E. Where an equipment component is of such a nature that local repairs cannot be made and it must be returned to the factory as a unit for overhaul, specific information concerning its repair and breakdown into component parts shall be provided.

2.04.02.10 USER MANUALS

A. A User Manual shall be provided for each software application. The User Manual shall include screen captures and easy to follow instructions to assist the users through all of the tasks that they may need to complete. The User Manual shall include an index.

B. As a minimum, the User Manual shall include all information that is available through the context-sensitive help system.

C. Fault procedures shall be described, as well as procedures for dealing with problems.

2.04.02.11 SYSTEM ADMINISTRATION MANUAL

A. A System Administration Manual shall be provided for each software application. The System Administration Manual shall outline all of the configuration parameters, details on how to configure the parameters, back up and recovery process, trouble shooting techniques and technical support information.

B. Fault procedures shall be described, as well as procedures for dealing with problems.

2.04.03 Review and Acceptance

A. Unless otherwise approved by the Community Transit Project Manager, all submittals shall be complete when issued. Incomplete or substantially under-developed submittals will be rejected, and shall not be considered as either a draft or final document.

B. The Contractor shall include three (3) weeks in their schedule for Community Transit review of each documentation submission, and shall include the necessary time and resources to modify the documentation to incorporate comments from Community Transit.

C. All pages of the documentation shall carry a title, version number and issue date, and all documents shall contain a complete subject index. The Contractor shall be responsible for fully coordinating and cross referencing all interfaces and areas associated with interconnecting equipment and systems.

D. Documentation shall require re-issues if any change or modification is made to the equipment or functions supplied. Through the course of the contract the Contractor may re-issue individual sheets or portions of the documentation that are affected by the change or modification. Each re-issue or revision shall carry the same title as the original, with a change in version number and issue date.

E. Final versions of all documents must be submitted prior to System Acceptance, incorporating all changes incurred through the course of the Contract.

F. Equipment installation drawings shall be prepared using AutoCAD and Adobe Acrobat.

G. As-built drawings shall be supplied to show engineering changes made to any component or module up to the end of the warranty period of the system supplied.

H. Each volume shall have a binder (stiff cover and spine), and drawings shall be protected by clear plastic to withstand frequent handling. The binding arrangement shall permit the manual to be laid flat when opened.

I. The paper used shall be of good quality and adequate thickness for frequent handling.

2.05 GENERAL TECHNICAL REQUIREMENTS

2.05.01 Physical and Materials Requirements

2.05.01.01 GENERAL

A. These requirements apply to all subsystems, unless more specific requirements are defined in the subsequent sections. In case of any apparent conflict, the subsystem requirements take precedence over General Requirements.

B. The on-board equipment shall be designed to provide a usable life of not less than fifteen years.

C. All equipment shall be designed for use in the transit industry, with specific attention to ergonomics, reliability, efficiency, and safety for passengers, operators, maintenance personnel and other system users.

D. Equipment furnished under these specifications shall be the latest model in current production, as offered to commercial trade, and shall conform to quality workmanship standards and use materials consistent with transit industry requirements.

E. The successful Contractor shall represent that all equipment offered under these specifications is new.

F. Used, shopworn, demonstrator, prototype, re-manufactured, reconditioned, or discontinued models are not acceptable for supply under this contract.

G. Onboard equipment shall be capable of being disassembled to fit through a vehicle door that is a minimum of twenty-four inches wide by sixty inches tall.

H. All components of the CAD/AVL system shall be built in accordance with best commercial practice. As a minimum, the design and construction shall provide for:

(1) Reliable and stable operation.

(2) Minimum maintenance and alignment procedures.

(3) Minimum number and variety of assemblies and spare parts.

(4) Maximum attention to human engineering.

(5) Simplified design and rapid fault isolation to reduce the requirement for highly skilled maintenance personnel.

I. The Contractor shall make required site improvements and provide all required structures, hardware, brackets, cabling, wiring, and services for equipment or elements to be installed at all sites. Unless otherwise noted, Community Transit will

in general be responsible for making sites ready for installation work, including the provision of power, network communications drops, and equipment boxes on coaches for the installation of onboard equipment.

J. All external screws, nuts, and locking washers shall be stainless steel or an approved alternate non-corrosive material; no self-tapping screws shall be used unless specifically approved.

K. All parts shall be made of corrosive resistant material, such as plastic, stainless steel, anodized aluminum or brass.

L. Equipment shall be designed to prevent unauthorized access, and to facilitate authorized access.

M. The Contractor shall utilize modular design throughout.

N. Standard, commercially available components shall be used wherever possible.

O. All functionally identical modules, assemblies and components shall be fully interchangeable between like modules for all equipment acquired under this contract.

P. Unless otherwise approved, all modules and assemblies shall be connected using standardized durable, positive-locking, indexed quick disconnect fasteners.

Q. All external connectors shall be weathertight and designed for use in a mobile environment subjected to dirt, water, oil and cleaning solvents.

R. Contractor shall include reasonable provisions to protect all equipment and components from common vandalism and physical abuse as may be expected on transit vehicles and at stops.

S. System components must be identical in mounting characteristics and inter-unit cabling across the entire fleet, so that a replacement piece of equipment is installable without modification in any of the vehicle for which it might be used.

T. Any retrofit or post-delivery change to one item of one type of equipment, shall be reviewed with Agency Project Manager and upon approval, changes shall be made identically to all units (except modifications that are clearly understood by the Contractor and Community Transit to be experimental and applied to less than five units).

U. Equipment and sub-components shall be identified by a part number and/or serial number, permanently and legibly affixed directly to the surface of the unit.

V. Unless otherwise specified in the sub-system specifications, all onboard equipment shall have a minimum 25,000 hours MTBF (Mean Time Between Failures).

W. Unless otherwise specified in the sub-system specifications, all central site equipment shall have a minimum 10,000 hours MTBF.

2.05.01.02 ELECTRICAL REQUIREMENTS

A. All device enclosures shall contain an easily accessible master circuit breaker that will remove power from the equipment when tripped.

B. Circuit breakers shall clearly indicate when they have been tripped.

C. All enclosures, chassis, assemblies, panels, switch boxes, terminal boxes, and similar enclosures or structures shall be grounded.

D. Protective grounding shall be provided to ensure that all exposed metal equipment and metal fixtures are connected to a common ground point in the electrical cabinet.

E. Conductors that have the potential of operating at 50 volts or more shall not be bundled with any other lower voltage conductors.

F. Wire dress shall allow sufficient slack for three additional “re-terminations” without excess tension.

G. Wire splices are not permitted.

H. Wire and cable ties shall not be so tight as to cause indentation and damage to the insulation.

I. Adhesive-mounted bases shall not be used to support wire ties or cable supports.

J. All conductors within each enclosure shall be installed free from metal edges, bolt heads, and other sharp or interfering points.

K. All conductors providing connections between components shall be provided with strain-relief, and be clear of moving objects that could damage either the conductor or the object.

L. All terminations and cables shall be clearly indexed, labeled and schematically identifiable.

M. All wire labels shall be non-metallic and shall resist standard lubricants and cleaning solvents.

N. When components must be connected to each other through individual wires, the wiring shall be incorporated into a wiring “harness,” where each branch of each circuit can be separated from others for troubleshooting.

O. Protection shall be provided against radio frequency interference (RFI) and electromagnetic interference (EMI) emission sources, as well as internal conductive or inductive emissions.

P. Contractor shall describe what provisions, under FCC part 15, shall be provided for EMI/RFI protection.

Q. The Contractor shall certify through the Contractor’s expense the electromagnetic compatibility of equipment to be furnished.

2.05.01.03 SOFTWARE REQUIREMENTS

A. All software shall be written in a common and well-known, modern, high-level, highly structured language.

B. All software shall be the current version in production at the time of installation (software versions to be approved by Community Transit).

C. All software shall contain version control numbers.

D. Features shall be provided to identify the software version on each device, and verify that it is the correct or most recent version for that device.

E. Software shall be organized in a modular, configurable manner to the extent reasonable.

F. Adjustable, Community Transit-specific, and configurable parameters shall not be hard-coded onto the source-code. They shall be user-modifiable.

G. Application software (both user and system) shall be portable, i.e., the source code shall be transferable to other computers using the same hardware and operating system without any modifications or use of hardware key.

H. The application software shall be reasonably scaleable to newer, higher performance hardware or operating systems.

I. Passwords shall not be displayed unencrypted on displays.

J. All application software shall be self-diagnostic.

K. All central system user interfaces shall have online help features.

L. The system date and time shall adjust automatically for daylight savings, Pacific Standard Time, leap year, and holidays.

M. The system date and time shall provide the same date for service times associated with a complete ‘Transit Day’, where number of hours in one day is based on start and end of service regardless of service extending past midnight.

N. The system shall maintain both 24-hour timestamps and 30-hour timestamps matching the 30-hour clock used by HASTUS.

O. Data transferred from a device or system shall not be purged or written over until at least one successful transfer is confirmed.

P. Features shall be provided to ensure that all system-created files are uniquely identified, and that no files are lost or missed during data transfer.

Q. Verification features shall be provided to confirm that there have been no losses of data at any point in the system.

R. The system shall be capable of remote paging of software alarms, with an escalation process.

S. The Contractor shall provide a comprehensive data backup and recovery plan.

T. The Contractor shall provide a data backup system for data archiving and recovery.

U. The data backup system shall include capabilities for Community Transit to back up data through network-wide backup.

V. It shall be possible to recover and transfer data files in the event of a primary data storage failure through a secondary standardized PC interface such as an RS-232 port. An alternate process for initiating data extraction and/or alternate means of removing data records may be provided which shall be subject to Community Transit Project Manager review and approval.

2.05.02 System Security Requirements

A. The Contractor shall develop a comprehensive System Security Plan which identifies the system elements which require protection, and identifies mechanisms, procedures and processes to counter security threats to those elements.

B. The System Security Plan shall describe the intended functionality for each of the system security elements, shall identify security threats, and shall describe procedures, functions and systems for detecting and mitigating those threats.

C. The System Security Plan shall identify system users, and describe rules that govern how those users will have access to system data, resources and processes.

D. The System Security Plan shall identify methods of detecting security breaches regardless of whether there is a detectable change in the performance of the system.

E. The Contractor shall implement system security services to achieve the approved System Security Plan.

F. The Contractor shall coordinate with the Agency to develop system security elements and procedures that function with existing Agency firewalls.

G. All AVL/CAD/APC systems, subsystems and devices shall allow only authorized users access.

H. The system shall provide access control based on the establishment of groups, users and roles:

(1) Groups, users and roles shall be assigned during system implementation as directed by the Agency Project Manager.

(2) A minimum of ten groups shall be provided for.

(3) It shall be possible to assign each user a unique identification and password, or assign a unique identification and password for each group, at Community Transit's discretion.

(4) The system shall include flexibility to add new groups, roles and users, redefine groups and roles, and reassign access permission as part of normal system operations.

(5) Access permission shall be assigned by the System Administrator.

I. All system access shall be recorded.

J. The system security shall include features to limit the propagation of access permission.

K. As a minimum, the system shall provide the following alarms, and shall notify the appropriate users in the event an alarm is triggered:

(1) Detection of invalid data or incomplete data packets

(2) Detection of a security breach

(3) Detection of a device or system fault

L. All alarms shall be recorded and stored in a database, along with a history of corrective actions.

2.05.03 Onboard Requirements

2.05.03.01 GENERAL

A. APTS equipment shall be installed on the Community Transit revenue fleet, including fixed route and paratransit vehicles, BRT vehicles, and Sound Transit vehicles operated by Community Transit and its contractor, First Transit.

B. Each vehicle deployed as a part of system shall be equipped by the Contractor with data mobile radio(s), GPS (Global Positioning System) based position equipment, appropriate Vehicle Logic Unit and a Mobile Data Terminal/System Control Head (hereafter referred to as the MDT).

C. It shall be the responsibility of the Contractor to properly locate all vehicle equipment, prepare all shop drawings, installation drawings, material fabrication drawings, and wiring drawings, and provide installation services as described in Section 2.11.02.01.

D. The installation method for all equipment must permit simple replacement (i.e. remove and replace) in the event of a device failure.

E. All vehicle equipment shall be “hot swappable”, and shall not require manual configuration on the coach in order to be fully operational.

F. All new Onboard System components deployed as part of APTS shall be compatible with SAE (Society of Automotive Engineers) standards J1708 and J1939, as well as universal serial bus (USB) or Ethernet as required to support onboard networking.

2.05.03.02 ELECTRICAL

A. In-vehicle devices shall meet 47 CFR (Code of Federal Regulations) Part 15 of FCC rules and regulations related to generation of and susceptibility to radio frequency interference (RFI). (Community Transit and the Agency Project Manager will determine whether or not any degradation or interference exists). Unless otherwise approved, all devices, cables and connectors shall be shielded and grounded.

B. Onboard components shall be designed for operation at a nominal voltage of +12 to +24 VDC, with an operating range of 9 to 39 VDC.

C. Onboard components shall be able to withstand sustained voltage levels of up to 48 VDC for up to ten (10) minutes.

D. Onboard components shall not suffer corruption of data when the power dips below 9 VDC.

E. Onboard components shall not be damaged by very high (twenty [20] times nominal voltage) short duration (up to ten [10] milliseconds) peak voltage.

F. Contractor shall indicate full operational and quiescent power drain for each on-board component proposed.

G. Contractor shall provide effective power regulators/conditioners/filters for all in-vehicle equipment. Specific tests shall be accomplished in each type of vehicle, by electrical system configuration, to assure that an effective filtering system has been identified, before installation in the remainder of the fleet. Proposals shall include the electrical tests and electrical purity goals to which the designs will be accomplished.

H. Wiring/installation diagrams for in-vehicle systems shall be provided by the Contractor for each make/model of both service and supervisory (manager) vehicle.

I. Operation of equipment shall not be affected by electromagnetic effects present during normal transit operations.

J. Operation of equipment shall not affect or be affected by vehicle components, such as engine ignition, or other on-board equipment including vehicle power supplies, radios, automatic vehicle identification systems, fare collection systems, and on-board data collection and processing equipment.

K. Operation of equipment shall not be affected by the electromagnetic fields generated by utility transmission lines, by an overhead catenary at distances as close as twenty-five feet, or by local power distribution lines at distances as close as fifty feet.

2.05.03.03 ENVIRONMENTAL

A. Mobile equipment must meet or exceed the following minimum conditions:

(1) Operating Temperatures between 14° and +158°F

(2) Storage Temperatures between – 4° and +167°F

(3) Humidity: 98% / 151° profile per SAE 1455

(4) Shock: 30g of 6 milliseconds

(5) Operating Vibration: 1.5g RMS, 5 to 150 Hz

(6) Endurance Vibration: 8g RMS, 100 to 1,100 Hz

(7) Dust and Water Ingress: Protected to IP (Ingress Protection) 54 for all equipment inside the coach.

(8) Inclination: 0 to 10 deg off vertical

(9) Water Solvents: Water spray on equipment from cleaning floors and walls, industrial solvents, rain, mud, snow and slush may come in contact with equipment

B. If the Contractor's equipment has been tested to different specifications than those defined above, the Contractor shall identify the environmental testing requirements utilized and results that were obtained. Such alternatives are subject to approval by Community Transit.

C. All exterior mobile equipment must be sealed and weatherproof to a rating of IP 65.

D. All components shall maintain specified performance when operated from mean sea level to at least 40,000 feet above sea level in an unpressurized cargo compartment.

2.05.04 Central Site Requirements

2.05.04.01 GENERAL

A. Monitors used to display AVL maps shall be large enough, have adequate resolution, and color definition for strain free viewing during normal operation.

B. System control shall be achieved with as few operator separate steps for commonly performed functions as possible, or by operator created macros.

C. Human factors shall be addressed such that repetitive stress injury (RSI) risk is low or none.

D. Dispatch equipment shall utilize the Community Transit console positions (furniture) for fixed-route and paratransit dispatch operations. New consoles for fixed route operations are being procured under separate contract.

2.05.04.02 NETWORK

A. The APTS central site equipment (dispatch consoles, servers, WLAN, etc.) will reside on a separate (from Community Transit's corporate network) network, to be provided by Community Transit and made available to the selected APTS Contractor.

B. All servers/services provided by the Contractor shall be integrated with, and shall be part of, Community Transit's existing security infrastructure (Microsoft Active Directory native 2003 or later). In the event that the Contractor is unable to meet this requirement, the Contractor shall supply any required servers and software to provide an equivalent level of security at no additional cost. Community Transit will be responsible for all network security management including any new servers provided by the Contractor.

C. Central site servers shall be installed in a designated location at Community Transit's data center at Merrill Creek. The Contractor in its Proposal shall identify any requirements for servers to be located at Kasch Park, and/or at any dispatch locations.

D. 100bT Ethernet connections will be provided at Community Transit's Merrill Creek facility.

E. For connections between Merrill Creek and the Kasch Park Dispatch location, T1 connections will be provided as required over the new microwave system (to be provided by others).

F. For connections to Senior Services (DART), a leased connection will be provided by Community Transit. The Contractor in its Proposal shall indicate data/bandwidth requirements for this connection, which in no event shall exceed that available through a T1 connection.

G. The Contractor shall provide fault monitoring systems for all network components supplied under this Contract. All fault notifications shall be forwarded to Community Transit's network monitoring and management system. Such notifications shall be

independent of any specific network monitoring and management software.

2.05.04.03 ELECTRICAL

A. All Equipment installed in Agency or third-party offices or facilities (with the exception of any on-board equipment) shall operate from a nominal line voltage of 120 VAC, within voltage tolerances of +10% to –10%, and a frequency range of 57 Hz to 63 Hz.

B. The Contractor shall provide equipment that meets applicable specifications and criteria of the Underwriters Laboratories Incorporated (UL), National Electrical Code (NEC), and the regulations of the State of Washington and local jurisdictions. The Contractor shall be responsible for securing Underwriters Laboratories and other electrical certifications, and shall be responsible for any costs associated with the certification process and/or inspections.

2.05.04.04 ENVIRONMENTAL

A. The Contractor shall survey Community Transit's existing office environmental conditions and confirm that it is adequate to the requirements of all. If the Contractor identifies a deficiency in the HVAC (Heating, Ventilation, and Air Conditioning), available equipment space, etc, they shall identify required upgrades, which shall be evaluated and if necessary provided by Community Transit.

B. Equipment shall maintain specified performance while operating in a controlled environment of +5°C to +33°C (+41°F to +92°F), relative humidity (non-condensing) less than 90% at 33°C (+92°F) for both intermittent and continuous periods.

C. Equipment shall maintain specified performance after being stored, non-operating, in a temperature environment of –10°C to +50°C (+14°F to +122°F) and shall maintain specified performance after storage exposed to a relative humidity of 90%, non-condensing, at +50°C (+122°F) for both intermittent and continuous periods.

2.05.05 Roadside Requirements

2.05.05.01 ELECTRICAL

A. All equipment installed at stops/terminals shall operate from a nominal line voltage of 120 VAC, within voltage tolerances of +10% to –20%, and a frequency range of 57 Hz to 63 Hz without equipment damage.

2.05.05.02 ENVIRONMENTAL

A. All outdoor equipment shall be designed for and suitably protected against exposure to snow, ice, fog, rain, hail, lightning, de-icing salt, and other environmental conditions prevalent in the Everett area of Washington State.

B. Enclosures shall include any provisions necessary to maintain the internal equipment at the manufacturer's specified temperature and humidity.

C. Enclosures shall be designed to prevent entry of moisture during a driving rainstorm and to minimize entry of dust. Exposed enclosures shall be IP 66 or NEMA (National Electrical Manufacturer's Association) 4 rated. The Contractor shall indicate in its Proposal any housings that do not meet these requirements, and shall identify any

alternative provisions incorporated to protect against moisture and dust, as well as requirements for installation.

2.06 ONBOARD SYSTEMS

2.06.01 Overview

The Contractor shall supply all equipment for Community Transit's fixed-route, paratransit, and non-revenue fleets as specified in the following table.

Equipment	Fixed Route Coaches	Paratransit Vehicles	Non-Revenue Vehicles
Vehicle Logic Unit	X	X	
Automatic Vehicle Location	X	X	
Mobile Data Terminal	X	X	
Automatic Passenger Counter	X		
Automated Stop Annunciation	X		
Emergency Alarm		X	
Remote Dispatch Terminal			X
Data Radio	X	X	X

2.06.02 Vehicle Logic Unit (VLU)

2.06.02.01 HARDWARE REQUIREMENTS

A. The VLU shall be designed for installation and operation in a transit bus environment.

(1) The VLU shall include provisions to protect against vibration, water ingress, vandalism, and corrosion.

(2) The VLU shall not have any moving parts (other than possibly a cooling fan).

B. The Contractor shall be responsible for determining the final location of VLU installation on each different coach type and configuration, subject to approval from Community Transit.

C. The on-board processing unit shall store the AVL and APC data in a non-volatile memory with sufficient capacity to hold thirty (30) days of data assuming up to 20 revenue round trips per day.

2.06.02.02 FUNCTIONAL REQUIREMENTS

A. For fixed route coaches, the VLU shall process data received from the APC, GPS and secondary position systems, and shall correlate it with date, time (both 24-hour system clock and 30-hour HASTUS clock), route, block, trip, stop ID, timepoint association, latitude/longitude, door open and door closed, wheelchair lift or ramp, and bicycle rack use data to provide stop-level counts.

B. The VLU shall act as the central processor, data storage, and device manager for all onboard systems supplied under this Contract.

C. The VLU shall replace the existing McCain Interface unit and shall provide control signals to the Transit Signal Priority (TSP) tag, destination sign, and possibly farebox (except BRT). Specifications and additional technical information on this interface is included in Attachment 2.

D. The VLU shall support and control SAE J-1708, SAE J-1939, Ethernet, and USB standards. Other interfaces may be provided as required for specific device-to-device communications.

E. The VLU shall include a minimum one 10/100BaseT Ethernet port, and two USB ports.

F. The VLU shall reconcile discrepancies between GPS and secondary position systems to provide the most accurate vehicle location information.

G. The VLU shall store all use data collected from other on-board components, with the exception of the smart card fare collection system components supplied by others until it can be transmitted to the central system as follows:

H. The VLU shall process and manage the transmission of data to/from the central system:

(1) Data shall include at a minimum: passenger count data from the APC system, schedule adherence, coach location/AVL data, messaging, data communications logs, service status changes, etc.

(2) Priority data (vehicle location, messages, alarms, on-demand load counts) shall be transferred to the Central System in real-time via the data radio network.

(3) Other data (configuration data, APC data) may be downloaded daily at the transit base through the Wireless Data On-Off Load System (WDOLS) shared with the smart card fare collection system (based on IEEE (Institute of Electrical and Electronics Engineers) 802.11g technology). Any data which has not yet been transmitted over radio shall be downloaded at the transit base.

I. The VLU shall be responsible for initiating and verifying the complete transmission of data through the WDOLS, and shall not delete or remove data until a successful transfer has been recorded.

J. The VLU shall include functionality and external interfaces to provide GPS position and time information to future devices/subsystems by others.

K. The VLU shall run diagnostics and report any problems with on-board APTS components (including the VLU itself).

L. The VLU shall automatically recognize any system process failure or lock-up and log the problem and attempt a restart. If restart of the process fails, notification shall be sent to the operator via the MDT and logged in the VLU for download at the end of the day.

M. The VLU shall manage power to all onboard devices supplied under this Contract,

and shall have two "power-down" timers as follows:

(1) One power-down timer that will keep the equipment operational for a configurable period of time (0-120 minutes) when the vehicle master switch is turned to "off", "lights" or "night park". This will allow the equipment to remain operational at a layover or extended stop.

(2) A second power-down timer that will gracefully log-off and shutdown the onboard equipment after a configurable period of time (0-120 minutes) after the first timer has expired. This will allow data transfers to be completed when the coach returns to the transit base.

2.06.02.03 PERFORMANCE REQUIREMENTS

A. The VLU shall be fully operational within ninety (90) seconds of power up or power restoration.

B. Data shall not be corrupted as a result of short-term power interruptions (e.g. vehicle startup) or power down.

C. The VLU shall include functionality to verify the successful transmission of data to the central system before purging any data records or buffers.

D. The VLU shall include functionality to re-transmit data in the event of an unsuccessful transmission.

2.06.03 Automatic Vehicle Location (AVL)

2.06.03.01 HARDWARE REQUIREMENTS

A. All revenue vehicles shall be equipped with AVL, including fixed route, paratransit, and BRT.

B. The AVL system shall include at a minimum the following hardware elements:

(1) A GPS receiver, integrated with the vehicle logic unit.

(2) A secondary position system consisting of an odometer interface or other dead-reckoning device.

(3) Exterior mounted, watertight GPS and Wireless LAN antennas to be mounted on the roof of the coach for standard height coaches and paratransit vehicles, and in an alternative location (to be approved by Community Transit) on double decker coaches (due to height constraints). Community Transit would prefer a combined GPS/Wireless LAN antenna to minimize the number of roof penetrations, but will accept separate antennas if required by the Contractor's design. The Contractor is advised that on some vehicles, the antennas may be mounted underneath a fiberglass cowling. This should be considered in the selection of appropriate antennas.

(4) All cables, wiring, connectors and labels.

(5) All mounting brackets, mounting hardware, sealant, and associated installation materials.

(6) Antenna ground planes for any and all vehicles with fiberglass roofs or where the vehicle chassis cannot be used as a ground plane.

C. The GPS receiver shall be a minimum 12-channel device, and shall include Wide Area Augmentation System (WAAS) protocols.

D. To support the use of the APTS to locate vehicles in the yard (through a separate Community Transit Trapeze OPS application – not part of this Contract), the preferred location for the GPS antenna is along the centerline of the roof at the front of the coach, or if that is infeasible, at a location no more than 20 feet behind the front of the coach along the centerline of the roof. In the event that this position presents RF (radio frequency) conflicts with the new data radio, existing voice radio and/or existing smart card WDOLS antennas, the Contractor shall be responsible for determining an alternative suitable location. The final recommended location is subject to approval by Community Transit.

E. The Contractor shall provide evidence that the proposed GPS antenna has been identified by the GPS receiver manufacturer as compatible.

2.06.03.02 FUNCTIONAL REQUIREMENTS

A. The automatic vehicle location (AVL) system shall provide real-time position (latitude/longitude), speed, time and compass direction data to the VLU.

B. The AVL system shall utilize WAAS as the primary source of position calculation. A secondary position system shall be used to correct GPS position data.

C. The AVL system shall be designed for operation in urban, suburban, and rural areas, including the ability to continue logical vehicle position tracking when a GPS signal is not available or a position fix is not possible. This could include, but is not limited to environments such as mountainous areas, heavily forested areas, office tower "canyons", tunnels, and multimodal transit centers located in garages.

D. The AVL system shall provide GPS time sync to other onboard devices supplied under this Contract.

E. Location data shall be sufficiently precise to accurately and reliably identify the location of each Community Transit vehicle on the street network.

F. Location data shall identify the location of each Community Transit vehicle in the parking lot at the base, subject to accepted GPS with WAAS correction accuracy measures. In the Proposal, the Contractor shall indicate the expected accuracy of this information. Location data shall be provided to the Trapeze OPS Yard Management software enabling the parking location to be automatically entered into Trapeze OPS Yard Management.

G. The AVL system shall provide an arrival and departure time each time the coach stops, and shall also provide arrival and departure times for each coded timepoint regardless of whether the coach has stopped or passed by the timepoint.

2.06.03.03 PERFORMANCE REQUIREMENTS

A. The AVL shall provide a positional accuracy of +/- 3 meters, 95% of the time.

B. The GPS position shall be updated every 5 seconds or less.

C. Vehicle location computation lag time shall not exceed two (2) seconds in the vehicle

(lag time is defined as the time it takes to compute position information, correct it, and update the onboard systems).

2.06.04 Fixed Route Mobile Data Terminal (MDT)

2.06.04.01 HARDWARE REQUIREMENTS

A. The MDT shall be a rugged computing device designed for operation in a transit environment.

B. The MDT shall be equipped with a color, liquid crystal display (LCD) touchscreen display.

C. The MDT touchscreen display shall measure a minimum 6.5” diagonally.

D. The MDT touchscreen shall provide VGA (640 x 480) resolution. Proposed use of any lower-resolution screens shall be identified in the Proposal.

E. The display shall be designed to have a service life of 15 years in normal use.

F. The MDT display shall include functionality to display different font sizes and styles on the same screen.

G. The MDT display shall include functionality to display both text and icon-based messages and key labels.

H. The MDT display must be readable in direct sunlight and must offer a low-glare setting for nighttime operation.

I. The MDT shall contain a small speaker and tone generator to be used to provide audio alerts.

J. The MDT shall be the minimum size feasible within these requirements and human factors design constraints, as space within the driver compartment of the vehicle is very limited.

2.06.04.02 FUNCTIONAL REQUIREMENTS

A. Mobile Data Terminals (MDT) shall be installed in each coach, and shall act as the user interface between the operator and all in-vehicle devices connected to the VLU, including providing the interface for the functions of initialization, operation, and configuration.

B. The MDT shall control settings for internal and external public address (PA) systems.

C. The MDT shall control settings for the activation or deactivation of automated stop annunciation (ASA) messages, including both interior announcements of upcoming stops and exterior announcements of route and destination.

D. The MDT shall be designed for simple and intuitive use by operators from varied educational backgrounds. The MDT shall not be configured in such a way as to require computer literacy from the operators.

E. The MDT shall be provided with a “quick reference card” summarizing basic operational processes and functions, to be included in the operators’ book. The design of the MDT shall not require that the operator reference this card or other documentation for normal daily use; it is intended as a supplemental reference only.

F. The MDT shall automatically configure and initialize itself for operation when the power is turned on with the default screen being the operator log-on screen.

G. The MDT shall initialize all in-vehicle devices integrated with the VLU in a single action as the operator enters the log-on information.

H. The interface and menu structure of the MDT shall be programmable through configuration data.

I. The MDT shall utilize a hierarchical multi-page menu structure. The MDT shall include functionality to scroll through a page and switch between pages.

J. The MDT shall provide simple access to “canned” text messages that are configurable by Community Transit.

K. Message selection, variable inputs, and interpretation of received messages shall be from menus and pop-ups that may change based on context.

L. The MDT display shall include default backlight, brightness, contrast, audio and tone settings.

M. The MDT shall include functionality to set audio tone types, frequencies, volume and duration through configuration data.

N. The MDT shall include functionality to set default display backlight, brightness and contrast settings through configuration data.

O. The MDT display shall have controls to allow the coach operator to adjust backlight, brightness, contrast, and volume settings within configurable limits. In no event shall such controls allow the screen to be set to all bright or all dark such that the text is unreadable.

P. Upon start-up and log-on the system shall revert to default settings for all configurable parameters.

Q. The MDT shall include operator log-on and log-out functions. The log-on function of the MDT shall permit the operator to initialize the system with an ID number that associates their name and background information with the vehicle for dispatch purposes for the duration of their scheduled block/run/route/route variant/trip.

R. The MDT shall validate log-on and trip change entries against an internal database of valid trips. In the event of an erroneous entry, the MDT shall sound and display an alert for the operator.

S. The MDT shall include functionality to send pre-defined messages to dispatch. Such messages shall be established through configuration data. The Contractor shall define a comprehensive set of messages that shall include at a minimum the following:

(1) Log on/log out/system test/maintenance

(2) Critical messages (including silent alarms)

(3) Vehicle status report

(4) On-route

(5) Out-of-service

(6) Call for a field supervisor

(7) Vehicle mechanical problem

(8) Minimum of five other pre-programmed messages

T. The MDT shall display at a minimum, current system wide transit time, vehicle status (in/out of service), block/run/route/route variant /trip, data messages, and schedule adherence status.

U. The MDT shall indicate that there are unread messages in the incoming message queue and how many messages are in that queue. The MDT shall also indicate when there are no more messages to be read.

V. The MDT shall move priority messages received to the front of the queue and provide visual and audible indications that a priority message has been received.

W. The MDT shall include functionality to skip a message in the queue, delete a message from the queue only after it has been displayed, or save a message to memory for long-term storage (until MDT shutdown).

X. All data messages entered or selected by the operator shall activate the data communications for transmission to dispatch. Emergency alerts/silent alarms shall be transmitted immediately to dispatch as a high priority data communication.

Y. Except for silent alarms, the MDT shall indicate to the operator that the dispatcher received a critical message.

Z. The MDT shall include a minimum three levels of critical messages including:

(1) Overt/Covert Alarm (highest priority - level 0)

(2) Emergency Services Requested (high priority - level 1)

(3) Non-Emergency Assistance Requested (priority - level 2)

AA. The MDT shall be configurable on a system-wide basis to provide non-priority messaging functions to the operator either at any time or only when the vehicle is below a customizable speed threshold.

BB. The MDT shall be able to receive and display a minimum of sixty-four characters in a message consisting of ASCII (American Standard Code for Information Interchange) coded numbers and letters. The MDT shall allow scrolling through the message at sixty-four characters or more per scroll action. The MDT shall be able to display multiple text sizes and multiple lines of text

CC. Messages displayed to the user shall be in a large font (approximately eighteen point) that is readable by a user with 20/20 eyesight from a distance of three feet.

Summary lists, tables of data, etc. may be displayed at a smaller font.

DD. The MDT shall provide maintenance personnel with a maintenance and test function screen(s) which can be accessed only with the appropriate password, provided either on an individual or group basis. This screen shall support data radio testing, on-board device diagnostics, and default configuration values for the MDT.

EE. MDT power shall be managed by the VLU, and shall be subject to the powerdown timers described in 2.06.02.02M.

FF. If no operator logout has occurred, the MDT shall remain active until the expiration of the first powerdown timer in the event the vehicle master switch has been turned to "off", "night run" or "lights". Once the second powerdown timer has triggered, the MDT shall automatically logout and shut down.

2.06.04.03 PERFORMANCE REQUIREMENTS

A. The MDT shall be fully operational within 40 seconds of power up or power restoration.

B. Data shall not be corrupted or operation disrupted as a result of short term power interruptions (e.g. vehicle startup) or power down.

C. The MDT shall not "freeze up" in the event that power is applied in the incorrect order (ignition sense versus continuous power on the load side of the master switch), or power is interrupted/drops during startup (e.g. from activating the vehicle ignition).

2.06.05 Paratransit Mobile Data Terminal (PMDT)

2.06.05.01 HARDWARE REQUIREMENTS

A. All paratransit vehicles shall be equipped with Paratransit Mobile Data Terminals (PMDT) suitable for operation in normal paratransit environments.

B. The Contractor may propose to use the same hardware as the MDT (though Community Transit would prefer a larger screen size to display mapping and other information), or may propose an alternative solution where the PMDT is integrated with, and provides the functions of, the VLU. In either event, the hardware specifications for the fixed-route MDT and/or VLU shall apply to the PMDT.

C. The Contractor shall recommend mounting location in each specific model and configuration of Community Transit paratransit vehicle.

D. The PMDT shall interface to the odometer for odometer mileage information. The Contractor shall state the type of interface proposed, the justification for the specific interface selected and the accuracy with the odometer on the console of the vehicle.

E. The PMDT shall have sufficient storage and processor capacity to display street, campus and apartment maps for Snohomish and King Counties.

F. All storage shall be solid-state. No removable disks or hard drives shall be permitted, though removable memory cards will be permitted.

2.06.05.02 FUNCTIONAL REQUIREMENTS

A. The PMDT shall provide all functions of the fixed route MDT, and additionally shall include paratransit-specific functions as described herein.

B. Through the central computer system, the PMDT shall provide two-way data exchange with Community Transit's Trapeze paratransit dispatching system.

C. The PMDT shall include paratransit-specific functionality to display electronic manifests and receive updates in real-time from Community Transit's paratransit dispatching system. Such manifests and updates will be generated by Community Transit's Trapeze paratransit scheduling system.

D. The PMDT shall automatically record pick-up time and drop-off time, and shall provide a simple and efficient means of entering other manifest information (i.e. adding or updating manifest information provided by the Trapeze dispatching system).

E. The PMDT shall display manifest information that includes at a minimum the following fields generated by the Trapeze paratransit dispatching system:

(1) Activity type (pick-up or drop-off)

(2) Estimated time

(3) Appointment time

(4) Actual arrival and departure times

(5) Odometer reading

(6) Address of pick-up or drop-off

(7) Location description (such as the name of the business or organization)

(8) Comments

(9) Thomas Brothers map book page number

(10) Client name

(11) Client ID number

(12) Client mobility codes

(13) Service type (Curb or Door)

(14) Fare type

(15) Fare paid

(16) Pass type

(17) Space type (ambulatory or wheelchair class: minimum three (3) types)

(18) Number of companions and attendants

(19) The manifest shall include entries for departing from and returning to the paratransit operating base

(20) System and mode transferred to/from for paratransit transfers

F. The APTS shall transmit individual trip assignments from the Trapeze system to PMDT units before the service day and as actions are taken in dispatch, with no additional keystrokes required by dispatchers.

G. The APTS shall transmit trip insertions or cancellations from the Trapeze system to PMDT units as these actions are taken in dispatch, and with no additional keystrokes required by dispatchers.

H. The APTS shall transmit the entire Trapeze comment field to the PMDT, to give the operator special information regarding a stop or a passenger, for example, requirements for custody of the passenger, instructions for finding a particular stop location, or other information.

I. The APTS shall allow dispatch to approve out-of-order stop instructions.

J. The APTS shall notify the operator of a new trip order or revised order or other dispatch message that requires positive acknowledgment by the operator within “n” stops of current location.

K. The APTS shall allow dispatch to transmit traffic condition and/or weather information to a single vehicle, the entire fleet or to vehicles within certain areas.

L. The PMDT shall allow the operator to indicate the actual means and amount of fare payment, e.g. cash, pass, or Smart Card, and full or non-payment, or amount paid.

M. The PMDT shall allow the operator to transmit the actual number of riders and attendants boarded for each trip.

N. The PMDT shall allow the operator to transmit the time that the vehicle arrived at the pick-up location and its location coordinates, and enter this information into the Trapeze “arrive” field for the “P” record of the trip.

O. The PMDT shall allow the operator to transmit the time that the passenger(s) indicated for the pickup location has been boarded, and enters this information into the Trapeze “collect” field for the “P” record of the trip.

P. The PMDT shall allow the operator to transmit the time that the vehicle arrives at the dropoff location, and its location coordinates, and enters this information into the Trapeze “arrive” field for the “D“ record of the trip.

Q. The PMDT shall allow the operator to transmit the time that the passenger(s) has deboarded at the dropoff location and that the vehicle is en route to its next scheduled location, and enter this information into the Trapeze “collect” field for the “D” record of the trip.

R. The PMDT shall record and transmits the vehicle’s odometer reading at each scheduled event in Trapeze (beginning and end of route, arrive and collect for each scheduled pickup or dropoff, breaks, lunch, out of service and refuel stops).

S. The PMDT shall permit the paratransit operator to log the following information when a vehicle is refueled: time, odometer reading, and number of gallons added.

T. In the event that a PMDT unit is unable to successfully transmit arrive or collect times and location coordinates for either a pickup or dropoff, the system shall store the time

and location of all schedule events relating to the pickup or dropoff, and transmit this information as soon as transmission is possible.

U. The PMDT shall assist the operator in tracking the amount of time required between arriving at a location and requesting dispatch to "no-show" a trip. The amount of time allowed for a "no-show" shall be configurable by the transit agency.

V. The PMDT shall allow the operator to notify dispatch that a passenger has not appeared at the indicated pick-up location within the specified time.

W. The PMDT shall allow dispatch to notify an operator that the trip is considered a "no-show".

X. The PMDT shall allow the operator to inform dispatch that a scheduled passenger has canceled their trip while the vehicle is at the pick-up location.

Y. The PMDT shall allow the operator to notify dispatch of a delay en route or in boarding/ alighting a passenger (through use of codes for issues such as traffic, weather, no parking, passenger delay in boarding, and wheelchair securement delay).

Z. The PMDT shall allow the operator to request dispatch approval to execute stop instructions out of the order shown on the PMDT screen.

AA. The PMDT shall allow the vehicle operator to "undo" or erase their last MDT transmission to correct an error.

BB. The PMDT shall allow the operator to request a break or lunch from dispatch.

CC. The PMDT shall allow the operator to use codes and/or text comments to indicate a problem in the schedule, add driving directions, changes in passenger mobility aids, etc.

DD. The PMDT shall allow operators who have breakdowns or vehicle problems to notify their dispatch center of the nature of the problem and their location.

EE. The PMDT shall allow the operator to notify dispatch of an accident as a priority transmission with only a few key-strokes.

FF. The PMDT shall allow the operator to alert dispatch to situations with a specific boarding and to request dispatch direction (situations might include no-fare, excess packages, oversize wheelchairs, etc.).

GG. The PMDT shall allow the operator to request that dispatch call the next passenger, alerting them to the impending arrival of the vehicle.

HH. Using AVL and mapping capabilities, the PMDT shall provide the operator with a computer-generated map showing the vehicle's location relative to the intended destination.

II. Using AVL and mapping capabilities, the PMDT shall provide the operator with driving instructions to their next destination. The driving instructions shall provide right-side arrival – i.e. the instructions shall ensure that vehicles arrive with the right-side of the vehicle facing the curb at their destination, except where such arrivals are

not possible due to one-way streets or other physical constraints.

JJ. On the map view, the PMDT shall indicate at a minimum the locations of the next three pick-ups and drop-offs.

KK. The PMDT shall include a simple means for switching between the map view and the manifest view.

LL. The PMDT shall allow the operator to transmit appropriate traffic condition and/or weather information to dispatch. This function can be provided through “canned” messages.

2.06.05.03 PERFORMANCE REQUIREMENTS

A. The PMDT shall meet the performance requirements of Section 2.06.04.03.

B. The PMDT shall update map display screens and vehicle position every 2 seconds or less.

2.06.06 Automatic Passenger Counter (APC)

2.06.06.01 HARDWARE REQUIREMENTS

A. APC equipment shall be supplied for each door of all fixed-route vehicles including local, express, double-decker and bus rapid transit vehicles.

B. The APC system shall utilize overhead infrared sensors for passenger counting, and shall be designed for operation with various door widths considering the coach type and configuration. Information on the fleet and the number of doors per coach can be found in Sections 2.01.02.02 and 2.02.

C. The APC system shall be provided with microswitches for door, wheelchair lift and bicycle rack sensing. Most vehicles are equipped with exterior bicycle racks. These exterior racks shall have a sensor that senses whether the rack is up or down. The BRT vehicles will initially have two interior bike racks, with potentially a third rack added in the future. Each rack shall have a separate sensor that senses whether that rack is in use, and a spare sensor input shall be provided for the BRT vehicles to accommodate the future addition of a third interior rack.

D. The APC system shall not interfere with operation of the doors.

E. The APC system shall not interfere with passenger ingress or egress.

2.06.06.02 FUNCTIONAL REQUIREMENTS

A. The APC system shall automatically count passengers at each transit stop and in-service stops made at non-transit stops (for all transit vehicle entrances/exits, including the rear door and center door if applicable). The following data shall be recorded:

(1) The number of boarding passengers (by door)

(2) The number of alighting passengers (by door).

(3) Wheelchair lift or ramp deployments

(4) Bicycle rack use

(5) Errors

B. Evidence of the reliability of the bicycle rack data shall be provided.

C. The system shall not allow manual correction of passenger counts to the original (source) data. The system shall provide features to manually correct data outputs (reported data) through the central system.

D. The APC system shall detect and track door openings correlating to actual transit stops. It shall be possible to account for siting of temporary stops, or temporary bus stop closures and re-routes. Actual transit stops may include flag stops on detours or other non-permanent locations. If the coach goes off-route, the system shall continue to log the longitude and latitude of all locations where the doors open/close.

E. APC data and reports shall be associated with Community Transit stop, route, route variant, and trip identifiers.

F. APC sensors shall function as specified.

G. The system shall record the use of devices including the wheelchair lift or ramp and bicycle rack.

H. The combination of sensors and logic shall properly detect and indicate the correct passenger count regardless of whether single or multiple persons are simultaneously entering or exiting at a door, or any simultaneous or overlapping combination of entering and exiting persons, or any movement through the infrared beams that is not associated with boarding or alighting activity.

I. The APC system shall provide real-time data for each coach through the system so current APC data is immediately available to Dispatchers and field personnel who have Remote Dispatch Terminals. Community Transit's preference is that such data be continuously available, however if data loading on the radio system is a constraint, Community Transit will consider "on-demand" access to this information.

J. The APC shall properly allocate boardings and alightings between different routes and route directions at terminals. This shall account for interlined trips, routes ending in loops, etc.

K. The APC shall provide a data structure for both raw and corrected/final data.

L. The APC shall provide high-level analysis tools to analyze archived data.

M. The APC counts shall reset at the end of each service day.

2.06.06.03 PERFORMANCE REQUIREMENTS

A. The APC system shall provide complete and accurate stop-by-stop boarding and alighting count data (for all stops – including stops for which there is no observed boarding or alighting activity).

B. The APC system shall meet the following accuracy requirements for a sample count

of 1,000 persons:

(1) Stop-level boarding and alighting counts shall have an error rate of less than 5% error for at least 90% of all stop locations

(2) Stop-level boarding and alighting counts shall have an error rate of less than 10% error for at least 99% of all stop locations.

2.06.07 Automatic Stop Annunciation (ASA)

2.06.07.01 HARDWARE REQUIREMENTS

A. The Automated Stop Annunciation system shall include:

(1) Onboard signs to provide a visual next stop announcement display.

(2) An interface with the coach PA system to provide audio next stop or route identification announcements on and off the coach, as appropriate.

B. Through configuration data, Community Transit shall be provided with functionality to identify the some stops be announced visually only, and that some stops be announced both visually and audibly. As part of the final design process, Community Transit will make a final determination of whether to announce all stops with both technologies, or have some stops announced visually only.

C. The onboard signs shall utilize high brightness, wide viewing angle, amber Light Emitting Diode (LED) technology.

D. Onboard signs shall be single line with a minimum 2.1” character height. The message display area shall be seven (7) dot-height by a minimum 90 dot-width for displaying next stop messages.

E. The time display shall be outside of the message display area, and may be provided either through additional dot-width on the display or through a separate display module integrated into the sign housing.

F. The sign, including housing and mounting hardware, shall not exceed 37” in width.

G. The signs shall be capable of displaying upper and lower case characters with proportional fonts. Characters shall be between three (3) and five (5) dot-width, with an average (mode) of four (4) dot-width.

H. The sign shall be capable of displaying double stroke width (bold) fonts.

I. The front face of the sign shall be designed to minimize glare.

J. The background shall be black, and the sign housing shall include a black border.

K. The position of the sign shall not block the viewing area of onboard video cameras.

2.06.07.02 FUNCTIONAL REQUIREMENTS

A. The ASA system shall provide ADA-compliant visual and audio next-stop announcement on the coach.

B. The ASA system shall provide audio announcements of the route and destination to passengers waiting at bus stops. This feature shall be configurable such that the route and destination may be announced at every stop, or only at selected stops as identified by Community Transit.

C. Message being played shall be displayed on the MDT.

D. The ASA system shall include functionality for:

(1) Automated operation that requires no interaction by the operator to trigger announcements (all triggering to be set as configuration data)

(2) Manual override to allow an operator to cancel or manually activate an announcement.

E. The ASA system shall be controlled by the MDT.

F. The ASA system shall announce transfer point and connecting route information.

G. The onboard systems shall include functionality to generate and display the following types of next stop and related messages:

(1) Audio location-based announcements onboard the coach (next stop, customer service, transfers, etc).

(2) Visual display in the interior of the coach of the route number and final destination of the coach.

(3) Visual next stop messages onboard the coach giving the location or name of the next stop.

(4) Visual display of the current, exact time (shall be shown with scrolling or alternating display).

(5) Time-based audio and textual customer service announcements onboard the coach.

(6) Announcements initiated by Dispatch.

(7) Pre-recorded audio customer service announcements.

(8) External announcements of the coach's route number and destination through a speaker mounted on the exterior of the coach, when the doors open at a bus stop.

H. All message content shall be configurable by Community Transit.

I. The ASA system shall be supplied with an automated process to import stop and other configuration data from Community Transit's Oracle tables managed through PeopleSoft.

J. Onboard systems and devices shall include functionality to comply with ADA requirements per 49 CFR part 37.167, sub-parts (a), (b) and (c), and part 38.35 sub-part (a). Requirements include but are not limited to:

(1) All stops shall be clearly and automatically announced throughout the inside of the coach

(2) Major intersections shall be announced whether the coach stops or not

(3) Major destinations shall be announced

(4) Major transfer points shall be announced

K. Automated internal announcements shall be triggered by the AVL system (through the VLU).

L. Automated external announcements shall be triggered by the door switch sensors.

M. The volume of the internal and external announcements shall be adjustable to a standard level through configuration data. The system shall include a minimum of three volume level settings that can be selected by the coach operator through the MDT.

N. The volume setting shall revert to its default value when the ASA is logged off or logged on.

O. The ASA shall receive its time synchronization from the VLU.

P. The system shall include an automatic gain control to automatically and independently adjust interior and exterior volumes depending on interior and exterior ambient noise levels.

Q. The signs shall have the functionality to display time and messages in the following modes, set through configuration data:

(1) A single, non-scrolling or changing message.

(2) A right to left scrolling message.

(3) An alternating (between two states) message.

R. Through configuration data, it shall be possible to set the arrival message to play once, play twice, or repeat in a loop while the door is open. If on a repeating loop, it shall be possible to set the repeat interval through configuration data.

S. The announcement shall be repeated automatically if the front door remains open for greater than a pre-determined time. It shall be possible to set this time through configuration data.

T. The ASA system shall include self-diagnostic capabilities, and shall provide diagnostic information to the AVL system.

U. The ASA shall provide maintenance technicians with a means of testing and setting both the internal and external audio default volumes and ambient noise sensor circuits.

2.06.07.03 OPTIONAL FUNCTIONALITY

A. The Contractor, in its Proposal, shall identify if the following optional functionality is available with their ASA system.

(1) The ASA shall include capabilities to provide announcements in multiple languages.

2.06.07.04 PERFORMANCE REQUIREMENTS

A. The system shall be designed for continuous operation without the need to manually "reboot" computers or devices.

B. LED's used in the onboard signs shall have a minimum service life of 80,000 hours in their installed configuration.

C. Both audible and visible messages shall begin playing within one (1) second of being triggered.

D. The ASA time-sync shall be updated at least once per day. A clock accuracy of +/- 20 seconds per day is sufficient for all ASA system components.

2.06.08 Emergency Alarm (Paratransit Vehicles Only)

2.06.08.01 HARDWARE REQUIREMENTS

A. Emergency alarm (EA) switches and associated, hardware, cabling and appurtenances shall be supplied for paratransit vehicles. Community Transit fixed route coaches are already equipped with emergency alarm capabilities through the voice radio system.

B. The Contractor shall determine the location for EA activation switches in all paratransit coach types and configurations, based on input from Community Transit's Vehicle Maintenance and Operations staff, as well as Contracted Service providers.

C. The EA activation switch shall be installed in a location easily accessible to the coach operator, and positioned such that activation can be done without visibly alerting a customer on the coach or in the boarding area.

2.06.08.02 FUNCTIONAL REQUIREMENTS

A. In the event of EA activation, the coach operator shall be notified covertly, such that the indication is identifiable only by a trained coach operator.

B. Activation of the overt/covert alarm shall initiate continuous tracking of the vehicle with highest priority being given to the vehicle for data communications.

C. The EA circuit shall be monitored continuously for continuity, and any faults shall be reported on the PMDT and provided to dispatch.

2.06.08.03 PERFORMANCE REQUIREMENTS

A. The dispatcher shall be notified of EA activation within 10 seconds of alarm activation.

B. In the event of EA activation, the coach operator shall be notified within 10 seconds of the alarm being acknowledged by a dispatcher.

2.06.09 Remote Dispatch Terminal (RDT)

2.06.09.01 HARDWARE REQUIREMENTS

A. The Contractor shall supply two (2) Remote Dispatch Terminal units (RDT's) to provide mobile computer aided dispatch functionality in selected Community Transit manager vehicles.

B. The RDT's shall be ruggedized laptop computers.

C. The RDT's shall be supplied with 3-point mounting brackets to position the laptop in a convenient position to the operator, and minimize vibration.

D. The RDT's shall be integrated with commercial wireless carrier communications infrastructure.

2.06.09.02 FUNCTIONAL REQUIREMENTS

A. The RDTs shall provide the following functionality:

(1) Automatic vehicle location (AVL) processing based on GPS position data

(2) Reporting of the location and status (in-service, out of service) of the non-revenue vehicle to dispatch

(3) Remote fleet and vehicle monitoring

(4) Bi-directional text messaging between the RDT and Central Dispatch.

(5) Receive, create, update and save incident reports and forms

(6) Remote fleet and vehicle monitoring management

(7) Ability to display systemwide bus timetables.

(8) Ability to display stop based schedule performance.

B. The RDT shall contain a color map-based display with functionality to provide the following views:

(1) Area-wide display showing all routes and vehicles within a zone or other geographic area

(2) "Rubber band" display showing a user-selectable area.

(3) Service display to select some or all of Community Transit Local, Commuter, Sound Transit Express, and Bus Rapid Transit Vehicles.

(4) Route display showing a specific transit route and all vehicles currently on the route

(5) Vehicle display to show the location of a specific vehicle on the map, and automatically track the vehicle (refreshing the map) as it moves

C. Map images shall be transmitted from the central system. Alternatively, the Contractor may propose to utilize local storage of map information, but shall describe how such information will be kept current and consistent with central map displays.

D. The map shall display vehicles using color-coded icons. Color-coding or icon changes shall be used to indicate vehicles that are off-schedule, off-route, or under a covert alarm situation.

E. The map display shall include pan and zoom functionality, and shall adjust the level of detail of the map based on the zoom level.

F. The map display shall automatically center on a vehicle issuing a covert alarm (where such alarm has been recorded or activated at dispatch).

G. The RDT shall include functionality to present tabular displays and summaries of transit vehicle information including at a minimum:

(1) Vehicle ID, block ID, route ID, route variant, trip ID, and operator ID

(2) Vehicle status

(3) Communications status

(4) Alarms

(5) Schedule adherence

(6) Schedule timetables systemwide (these can be static)

(7) Schedule adherence in relation to a single selected stop or exchange.

H. The RDT shall include functionality to automatically center in on a vehicle or vehicles by selecting a vehicle, block, route, route variant, or trip from a graphical or tabular display.

I. The RDT shall include functionality to query or search on a operator, vehicle by selecting a vehicle, block, route, route variant, or trip from a graphical or tabular display.

J. The RDT shall include functionality to send canned or free form text messages to a vehicle or group of vehicles.

K. The RDT shall have equivalent message handling capabilities to the fixed route MDT, plus the functions described below.

L. The RDT shall include functionality to send pre-defined messages to dispatch. Such messages shall be established through configuration data. The Contractor shall define a comprehensive set of messages that shall include at a minimum the following:

(1) Log on/log out/system test/maintenance

(2) Critical messages (including silent alarms)

(3) Vehicle status report

(4) In/out-of-service

(5) Responding to road call

(6) Vehicle mechanical problem

(7) Minimum of 15 other pre-programmed messages

M. The RDT shall include the following incident report management functionality

(1) Create, populate, prioritize and close incident report and forward to central dispatch.

(2) Receive open or closed incident report from central dispatch.

(3) Update open report received from central dispatch, and return updated information or closed report.

(4) Store and retrieve reports.

(5) Send a page or txt message to a pager/wireless device if a critical incident report is received.

N. RDT incident reports shall be configurable from the central incident reporting system, allowing modifications to the reports in terms of arrangement, data fields, labeling, and data entry options.

O. Laptop computers used for remote dispatch shall also include functionality to provide normal office functions such as Internet access, email, and business application operation without disrupting APTS operations.

2.06.09.03 PERFORMANCE REQUIREMENTS

A. The RDT shall be a “ruggedized” laptop designed to be permanently mounted in assigned vehicles.

B. The RDT shall be designed to withstand the temperature ranges identified in 2.05.03.03.

C. The RDT shall avoid delays (including the selection of the commercial communications service and equipment) of more than 10 seconds in the updates of screens when in an area of appropriate coverage.

2.07 CENTRAL SITE SYSTEMS

2.07.01 Hardware Requirements

2.07.01.01 DISPATCH CONSOLES

A. The system shall be supplied with all required hardware and operating system software. Hardware shall include at a minimum computer processing devices, keyboards and navigation devices, and displays.

B. All displays shall utilize LCD technology and have a minimum 20” diagonal measure.

C. The user interface shall utilize MS-Windows standard navigation, icons and shortcut keys.

D. All workstation software shall operate on the Microsoft XP operating system or alternative Microsoft OS (Operating System) as approved by Community Transit.

2.07.01.02 HARDWARE AND SOFTWARE STANDARDS

A. All hardware and software supplied under this Contract shall be per Community Transit hardware and software standards as listed below. The Contractor shall identify in its Proposal any proposed alternatives to these standards.

B. All servers shall be Dell PowerEdge 2950 or newer with processing capabilities and storage as required to meet the requirements of this RFP. Rack mounted servers shall be supplied.

C. All servers shall be RAID (Redundant Array of Independent Disks) Level 1 or better.

D. All servers shall be supplied with a built-in Remote Access Card (RAC) – one per server.

E. All workstations shall be current generation Dell or Hewlett-Packard with processing, storage and video capabilities as required to meet the requirements of this RFP.

F. All network devices, including WLAN devices, shall be current generation Cisco Systems devices.

G. All software supplied shall be compliant with the following operating system and application software standards:

(1) *Operating Systems and Databases: MS Windows 2003, MS Exchange 2007 Server, MS SQL 2005 Server, MS SharePoint 2007 Server and Oracle 9i Enterprise/Standard DBMS.*

(2) *Desktop Applications: MS Office 2007 and Internet Explorer 7.*

(3) *Other Applications (as applicable): PeopleSoft Financials, HCM, EPM, Trapeze OPS, Trapeze Pass, FleetFocus, HASTUS, TrackIT Development Tools, Cold Fusion, and MS Visual Studio.*

H. Community Transit hardware and software standards will be updated to reflect current generation at the time of Preliminary Design. All APTS central site components shall be based on the generation identified at that time.

I. Backup storage media, drives, and software shall be provided for the management servers. This media shall be DVD, CD or other suitable storage media, subject to approval by Community Transit.

J. The Contractor shall provide sufficient media for storing sixty (60) months of data. The Contractor shall provide all required hardware and software for accessing archived or backed up data.

K. Disk capacity shall be sufficient to store the applications, maps, data and associated files required for the operation with 100% expansion capacity.

L. All computer equipment shall have a minimum 10,000 hours mean time between failures (MTBF).

M. The Contractor shall supply and install enclosed equipment racks for all rack-mounted equipment. All racks shall be standard EIA (Electronics Industry Alliance) 19” (inch) and be constructed and installed to meet seismic requirements for Seismic

Zone 4. All racks shall be APC NetShelter SX, 42U 600mm wide by 1070mm deep.

N. All servers, wiring, network, back-up power/filtering units shall fit within the racks, and all wiring shall be clearly labeled and physically supported using support devices that are compatible with the supplied racks. Plans for rack layout shall be submitted in advance for approval by Community Transit.

2.07.02 Functional Requirements

2.07.02.01 CENTRAL PROCESSING SYSTEM

A. The system shall include central application software and hardware as required to process APC data, process AVL data, manage configuration data, manage and log incidents and events, and report diagnostic information.

B. The Central System shall be compatible with Community Transit's existing HASTUS scheduling software, HASTOP, Rider, Trapeze OPS, and Trapeze Yard Management. HASTUS will provide the Central System with route, schedule, and run data as well as stop locations. Trapeze OPS will provide operator vehicle assignment information.

C. HASTUS data to be provided by Community Transit includes alphanumeric identifiers for route, timepoints and stop codes. The Contractor shall be responsible for importing alphanumeric information and translating it as required into numeric information as may be required for the operation of the APTS. In its Proposal, the Contractor shall describe any proposed approaches to providing such translation, and describe how the process can be managed on an ongoing basis assuming that Community Transit retains alphanumeric identifiers in its business systems.

D. Community Transit desires that the Central System provide a data output compatible with the HASTUS-ATP runtime analysis module. Additional information is contained in Attachment 3.

E. The Central System shall include a two-way interface with Community Transit's existing Trapeze PASS paratransit dispatching software.

F. The central processing system shall provide the following functionality:

(1) Manage the communications with all APC/AVL equipped vehicles

(2) Import schedule and operator data from the HASTUS system operated by Community Transit

(3) Create and manage all APC and AVL configuration data

(4) Create and manage APC reports by Community Transit, including but not limited to passenger flows by door, passenger flows by stop, lift use, bike rack use, and loads

(5) Create certain National Transit Database (NTD) report data

(6) Create diagnostic and system performance reports

(7) Provide a real-time AVL interface to external systems to provide the location of all APC/AVL and AVL-only equipped coaches.

G. The AVL map system shall be based on standard digital GIS data provided by the

Community Transit GIS Program. Digital data may include Community Transit bus routes, Sound Transit bus routes, route-stop-sequences, bus stop points, park & ride/transit center locations, park & pool locations, landmarks, and street network lines (with attributes).

H. The AVL shall include functionality to import Community Transit GIS data in ESRI (Environmental Systems Research Institute) shapefile format, with a projection/coordinate system based on: Washington Stage Plane Coordinate System, North FIPS (Federal Information Processing Standards) Zone 4601, Datum: NAD 1983, Spheroid: GRS_1980, Units: Feet.

I. The AVL stop and station database shall utilize Community Transit's existing stop identification numbering system as assigned by Community Transit (up to six alphanumeric characters per stop).

J. The AVL shall automatically reconcile APC data with route, trip and stop information provided by Community Transit scheduling systems.

K. Community Transit's preference is that APC data reconciliation be conducted on the coach through automatic association of recorded stop data with route, trip, and stop information. Alternatively, the Contractor shall provide software and features on the Central Processing System to associate and reconcile APC data with route, trip, and stop information provided by the scheduling systems.

L. The Contractor shall identify their proposed approach to reconciling APC data with route variant, trip, and stop information, and shall identify any expectations or assumptions with respect to activities to be carried out by Community Transit staff in support of such reconciliation.

M. The AVL interface shall also supply current route variant and block/run/route/trip ID.

N. The central processing system shall be used to generate and manage device configuration, generate reports, and manage device fault reporting and logs.

O. The central processing system shall maintain an inventory of all onboard devices in use, and shall identify devices that have not reported in after a period of time (this time period shall be configurable).

P. The system shall utilize a commercial off-the-shelf reporting utility capable of producing standardized or regular reports, as well as custom reports. The utility shall include ASCII, delimited text file, XML (eXtensible Markup Language), and DBF (dBase file extension) table export capabilities.

Q. The system shall provide for the import of stop and route mapping data using common or industry standard file formats and Community Transit standard formats.

R. The system shall have the capability of hardware and software extension to include new or additional features.

S. The system shall be designed to migrate to updated versions of hardware and software operating systems.

T. Disk mirroring and other techniques shall be utilized to minimize loss of data in the event of a storage device failure. Failure of a storage device shall not result in loss of

current configuration data.

U. It shall be possible to navigate with keystrokes in lieu of mouse action. A library of keystrokes and short cuts shall be provided.

V. The Central System shall provide XML feeds of fixed route schedules and real-time status data for integration with current and future external systems.

W. Any faults or errors that occur during the automatic conversion or transfer of data either within internal subcomponents of the central system, or from external data sources to internal subcomponents, shall be logged and critical operational items automatically emailed to a predefined Community Transit email distribution list.

2.07.02.02 COMPUTER AIDED DISPATCH – FIXED ROUTE

A. The Contractor shall supply a full-featured (by industry standards) CAD functionality that has been previously proven in transit operations.

B. The CAD system shall be integrated with the data communications system.

C. The CAD system shall allow for multiple dispatchers at multiple dispatch locations over the LAN/WAN (Wide Area Network) to be provided by Community Transit within the Merrill Creek facility, and from Merrill Creek to Kasch Park and Senior Services (DART).

D. CAD functional capabilities shall be the same across all dispatcher workstations provided for the system.

E. The CAD system shall provide representation and management of fixed route service by the following:

(1) Block. This refers to the complete piece of work for the vehicle, which may include multiple routes/interlined trips.

(2) Run. This refers to the complete piece of work for a operator (duties) that may include coach changes during the course of the day.

(3) Route: This refers to the overall route identifier, under which there would be a series of route variants.

(4) Route Variant: This refers to the series of points that designate a particular path or paths that define the route variant or pattern.

(5) Trip: This refers to a specific one-way trip for the vehicle related to start/end times and points.

F. The CAD system shall allow for the distribution of work amongst dispatchers by routes, vehicle types, or vehicles or by geographic area.

G. The CAD system shall allow for dispatchers to modify coach or operator work distribution throughout the day as required by staff and workstation availability.

H. The system shall include the distribution of dispatcher workload by configurable groups of blocks, routes or trips, with all data associated with a block, route or trips on that route being directed to particular dispatchers. The workload assignment shall be such that no route can remain unassigned. Regardless of route assignments, all

dispatchers must have the ability to see and monitor all coaches in the system at all times.

I. The number of licenses provided for dispatch workstations shall be a minimum of 12, with the option to procure up to an additional 4 licenses to accommodate future growth.

J. User access levels shall be configurable such that different people and positions have access only to the features that they need.

K. Community Transit is interested in the capability to assign different groups of routes to receive different polling frequencies. The Contractor shall indicate in its Proposal if this function can be provided.

L. The CAD software shall utilize typical Windows style graphical user interface conventions such as resizable windows, point and click, right click context menus, drop-down menus, toolbars, color displays, icons, drag and drop, scroll bars, scroll wheel mouse, status bars, etc.

M. The system shall include a user interface that is user-friendly, accessible, and intuitive for all users.

N. The CAD system shall support mouse and keyboard inputs with all key features supported by keyboard shortcuts.

O. The CAD system shall provide for enlarged fonts and have easy to read displays when dispatchers are situated a standard distance from the display.

P. The CAD software shall allow individual dispatchers to:

(1) Log-on with appropriate password.

(2) Log-off.

Q. A minimum of two levels of CAD access shall be allowed including:

(1) Supervising dispatcher/system administrator – with the ability to adjust all CAD software preferences.

(2) Standard dispatcher – without the ability to adjust preferences (such as vehicle status color indications or icons).

R. Access to the CAD software shall be secured by standard passwords managed and controlled by system administrator functions through a standard operating environment.

S. The system shall support three separate displays per workstation position.

T. The system shall provide two-way text messaging between transit vehicles and dispatchers. Dispatch shall have the capacity to send a text message to a single coach, a specific group of coaches, a specific operator, or all coaches.

U. The CAD system shall include “canned” (pre-defined) and free form text messaging functionality.

V. The CAD system shall provide for a minimum 20 canned message types that may be broadcast from vehicles with MDTs to dispatch.

W. Canned text message types shall be determined by Community Transit and configured into the appropriate MDTs and CAD software. Where appropriate, canned responses to canned messages shall be available to both the vehicle and dispatcher, and responses will also be determined by Community Transit.

X. The CAD system shall support free form messages typed by the dispatcher up to 255 characters in length.

Y. The dispatcher shall be able to initiate text message communications by:

(1) Selecting a message from the queue

(2) Selecting a vehicle from a list.

(3) Entering an operator ID, vehicle ID or group ID.

(4) Entering a route ID, trip ID or block ID

Z. The dispatcher shall be able to reply to a text message in the queue in either a canned response or free-form text message by clicking on the appropriate message.

AA. When a dispatcher receives a text message from a coach operator, the system shall display the operator's name, employee number, trip number, coach number, route number, route variant, route direction, vehicle location, and the time of the message.

BB. The system shall provide an incident and message queue containing all text communications, vehicle status changes, etc. with priority of the messages displayed being configurable.

CC. The CAD system shall provide the following basic views in addition to the message queues:

(1) Map displays (allowing for multiple map windows and zoom settings).

(2) Route displays indicating vehicles in relation to stops along a route.

(3) Vehicle lists of all vehicles active in the system.

(4) Driver lists of all operators logged into the system.

(5) Trip lists of all trips logged into the system.

(6) Incident or event lists (for work assigned to dispatcher or coach-specific) which shows all actions conducted through the CAD.

DD. The performance and output of the CAD/AVL data and mapping software must be accurate, correctly reconciling to stop locations and the centerline of the street.

EE. The map system shall be compatible with Community Transit's ESRI based GIS system.

FF. The digital mapping system must be able to import Community Transit's GIS data on a periodic basis.

GG. The dispatcher shall be able to open, close, tile, or resize map windows.

HH. The map display shall be capable of displaying a variety of geographic features. It shall be possible to independently set features to be visible or hidden by map layer without limitations on the numbers of layers. The map display shall display these features:

(1) Freeways & highways (with appropriate shields)

(2) Major and minor streets (with appropriate names)

(3) Rail track

(4) Transit centers

(5) Transfer points

(6) Bus stops and stations

(7) Rivers, lakes, and other major bodies of water

(8) Parks

(9) Agency maintenance yards

(10) Airports, hospitals, police stations, fire stations, and schools

II. The map view shall include functionality for pan, zoom in/out, window zoom, and multiple map displays. The map display shall be configurable to display different levels of detail (such as street names) at different zoom levels.

JJ. Dispatchers and supervisors shall have the ability to filter the coach location display by the following options. It shall be possible for routes to be assigned to multiple groups simultaneously by some or all of the following criteria:

(1) Route number

(2) Route variant

(3) Trip

(4) Groups of routes

(5) Operating base

(6) Vehicle type

(7) Coach number

(8) In-service and on-schedule (by a configurable period)

(9) Behind schedule (by a configurable period)

(10) Running early (by a configurable period)

(11) Out-of-service

(12) Not logged in

(13) Emergency/panic alarm activated. Note that as there will be no direct integration with the fixed route vehicle emergency alarms, the central systems must include the ability for a dispatcher to manually set a vehicle into EA mode from the dispatch console. Paratransit alarms shall however be provided under this Contract

(14) Off-route (by a configurable distance)

(15) Communications interruption

KK. The dispatcher shall be able to center a map view on a vehicle or track a vehicle by:

(1) Selecting the vehicle on the map display

(2) Entering the vehicle, operator ID or trip

(3) Selecting the vehicle from a list of vehicles

LL. Views for "tracked" vehicles shall automatically update each time the position or status changes.

MM. The base polling frequency for updates to the location of each coach shall be no longer than every 60 seconds, or as frequently as the capacity of the Communication System permits, but in no event greater than every 90 seconds. As part of its Proposal, the Contractor shall identify its recommended polling frequency based on the data radio system proposed and Community Transit's current fleet size. The Contractor shall also identify if more frequent polling of the BRT vehicles can be provided.

NN. The system shall indicate any vehicle that is not reporting back on regular intervals and/or over multiple polling cycles.

OO. The CAD system shall display vehicles via icons displayed in a map view (as well as vehicles indicated in a list). Icons shall be configured in the system and standard across CAD workstations. Icons shall clearly indicate position in relation to the map and direction of travel. A minimum of 10 vehicle icon types shall be available for configuration. Dispatchers shall be able to call up "flags" noting vehicle IDs, operator name, trip number, coach number, and route number.

PP. Icons shall allow for the display of vehicle status such as:

(1) In-service and on-schedule (by a configurable period)

(2) Behind schedule (by a configurable period)

(3) Running early (by a configurable period)

(4) Out-of-service

(5) Not logged in

(6) Emergency/panic alarm activated. Note that as there will be no direct integration with the fixed route vehicle emergency alarms, the central systems must include the ability for a dispatcher to manually set a vehicle into EA mode from the dispatch console. Paratransit alarms will however be provided under this Contract

(7) Off-route (by a configurable distance)

(8) Communications interruption

QQ. The following types of vehicle status shall be flagged as exceptions, through the use of a different color or other means. They shall also trigger an alert directed at the dispatchers:

(1) Behind schedule (by a configurable period)

(2) Running early (by a configurable period)

(3) Not logged in

(4) Off-route (by a configurable distance)

(5) Emergency/panic alarm activated

RR. The system shall distinguish between normal and estimated timepoints. Community Transit defines "running early" as any amount earlier than the scheduled time. However, some Community Transit routes (especially commuter routes) include "estimated" timepoints to which this does not apply. It shall be possible to set "running early" and "running late" thresholds for estimated timepoints.

SS. Vehicles that are "in service" shall be displayed in a different color than vehicles that are "out of service" on the CAD display. Also, vehicles deadheading back to base, "pull-out" (non-revenue trips departing base) and "pull-in" (non-revenue trips returning to base) trips shall be in different colors.

TT. The system shall display the number of passengers aboard each coach, updated in real time as coach locations are polled.

UU. The system shall alert dispatchers when a coach is operating over its capacity. Capacity thresholds shall be configurable by Community Transit by coach type and route type. For Community Transit local services, standing capacity will most commonly be used. For Community Transit Express, Sound Transit services, and BRT, Community Transit may wish to use seated capacity. This data shall be archived for planning purposes.

VV. The system shall display the average speed of the vehicle along the route.

WW. Dispatchers shall have an option to query a list of all coach operators currently driving a route, including at least the following information:

(1) Operator name

(2) Employee number

(3) Route number

(4) Coach number

(5) Trip number

(6) Time coach departed base

(7) Time operator due back to base

(8) Whether the operator is returning the coach to base or being relieved in the field

XX. The system shall notify Community Transit Customer Service automatically of significant service disruptions, such as unusual delays, incidents, reroutes, or missed trips. The criteria to determine "significant" shall be configurable by Community Transit.

YY. The CAD screens shall provide access to a line display showing the locations of all coaches in service along a specified route, including:

(1) Headways

(2) Gapping

(3) Schedule status

(4) Layover time

(5) Original route

(6) Interlining route

(7) Dispatch action (short-turn, added trip, etc.)

ZZ. The system shall provide a service summary display that summarizes schedule adherence, gapping/bunching, headways, and status by route. Routes displayed for each dispatcher shall be filtered to include either all routes or only those routes for which they are responsible. This service summary data shall be captured in a reportable format.

AAA. The CAD system shall provide tables displaying all current schedules by route, block, and pattern.

BBB. The CAD system shall provide for links for automatic data transfers between the HASTUS scheduling software and CAD scheduling. Automatic transfers will occur from a set file directory for HASTUS where only the appropriate and current schedule will be made available. The current version of HASTUS is 2005. Transfers shall meet the following requirements:

(1) The CAD system shall be responsible for providing and configuring these links between HASTUS and the CAD system.

(2) The CAD system shall allow for full or partial updates of schedule information.

(3) The CAD system shall only activate schedule transfers during periods that will not impact operations.

(4) The Contractor shall be responsible for ensuring all data required for the CAD system from HASTUS is properly imported.

(5) The Contractor shall be responsible for ensuring all necessary network configurations are in place to allow for schedule data transfers to take place.

(6) The Contractor may provide for more direct integration between the CAD system and HASTUS databases if the same functionality is achieved.

(7) The CAD system shall allow for modifications to scheduling data within CAD once the automatic transfers have taken place.

(8) Any failure or translation errors during automatic data transfers shall be immediately and automatically reported via email to a predefined email distribution list of Community Transit staff.

CCC. The CAD system shall support and provide displays of operator trip and vehicle rosters/lists.

DDD. The CAD system shall provide for operator information such as name, employee number, vehicle assignment, block/trip assignment, safety record rating.

EEE. The CAD system shall allow dispatchers to add, delete, or temporarily replace/re-assign operators by vehicle and block trip. Operator assignments shall be automatically updated as operators sign-in/out of their vehicle MDTs.

FFF. The CAD system shall allow dispatchers to view vehicle details such as vehicle type, make/model, garage assignment, route assignment, schedule adherence, block/trip, and vehicle identification (ID) number.

GGG. The CAD system shall create an incident message when a vehicle or operator reports a serious mechanical problem.

HHH. The CAD system shall provide an audible and visual alert to Dispatch, Radio Supervisor, and others using the system when an emergency alarm is activated and the CAD/AVL system shall monitor that coach continuously until otherwise specified by Dispatch.

III. The CAD system shall support both covert alarms and overt alarms. When receiving an alarm the CAD system shall zoom and center the map display on the alarming vehicle at the discretion of the dispatcher.

JJJ. The CAD system shall allow covert alarms to be downgraded to overt alarms. The CAD system shall allow all alarms to be cancelled at the discretion of the dispatcher, and all cancelled alarms shall be logged and stored in the incident log.

KKK. The CAD system shall provide an in-system response plan that will be configured by Community Transit and the Contractor during system development. This response plan will contain a list of steps, list of emergency contacts, and additional emergency information.

LLL. The CAD system shall be capable of indicating schedule adherence for all in-service fixed route vehicles.

MMM. Schedule adherence shall be visible to the dispatcher via a minimum of these methods:

(1) Color or style of vehicle icons displayed in the map display.

(2) List or table of vehicles noting schedule adherence.

(3) List or route diagram noting schedule adherence by vehicle on that route.

(4) Systemwide summary of schedule adherence by route.

(5) Block list of schedule adherence in tabular format.

(6) Systemwide summary of schedule adherence by trip

NNN. The CAD system shall allow the dispatcher or dispatch supervisor to adjust the thresholds under which a vehicle is considered:

(1) Running "hot" or early – by number of minutes

(2) Running late – by number of minutes

OOO. The default criteria for "running late" shall be configurable in minutes behind schedule. In addition, the CAD shall provide a separate configurable "late" parameter specifically to support transit priority and other needs.

PPP. Schedule adherence shall be determined on the vehicles and communicated to the central system for display on the CAD workstations.

QQQ. The CAD system shall provide dispatchers with real-time access to APC load count data for each coach. Configurable APC data alerts shall be provided for situations such as the following:

(1) Coach is operating over capacity (configurable as seated or standing capacity by individual route).

(2) Number of passengers on a coach at the time an emergency notification has been given.

RRR. The CAD system shall generate an off-route alarm for vehicles deviating from routes by a configurable distance.

SSS. The CAD system shall include functionality for adjustments to service including as a minimum:

(1) Modifications to time points.

(2) Cancel or add blocks/trips.

(3) Adjust for temporary detours.

(4) Reassign or remove vehicles from certain routes or blocks (such as may be required by a mechanical issue).

TTT. The system shall include entry and management of a series of standard dispatch and service restoration/correction functions including:

(1) Detour – Activate predefined detours for service routes.

(2) Ad-hoc Detour – Create short-term detours to avoid construction activity or respond to special events.

(3) Short-Turn – Short-turn a coach to restore schedule adherence/headways.

(4) Delete/Add a Trip – Delete or add trip to a block to adjust service levels.

(5) Replace a Coach/Operator – Assign a replacement vehicle and/or operator to take over service from a scheduled trip that cannot continue due to a disabled coach (or any other reason).

(6) Skip Stop – Notify an operator to bypass a series of stops to restore headways with the ability to identify the starting and stopping point for the skip stop measure.

UUU. Dispatchers shall have the option to see a list of routes and/or vehicles that are currently affected by a detour.

VVV. All dispatch functions shall be supported by automatic messaging to trips/vehicles/operators and confirmation messages to dispatch, and shall be logged in the CAD/AVL database.

WWW. The system shall include a function that allows for the identification of supervisor and support vehicles closest to an individual coach trip selected by the dispatcher. Once these resources are identified, the dispatcher shall be able to assign a response to the closest available support vehicles. This will automatically forward a message to these supervisor vehicles and highlight the location of the coach in question.

XXX. A manager or other authorized user using a remote dispatch terminal (laptop) shall

be provided with remote dispatch functionality similar to the dispatch workstations. The system shall also support expansion of this functionality to other users and Community Transit's Mobile Operations Center.

YYY. Remote dispatch functionality shall include, at minimum:

(1) Text messaging

(2) Service summary displays

(3) AVL map/vehicle status displays

(4) Ability to enter and update incident reports

(5) Ability to display incident/message queues

(6) Performance summary information/ladder displays for tracking route performance

(7) Transfer protection information

(8) Access to trip card information

(9) Ability to filter route display by assignment to a particular Road Supervisor (this feature shall not limit each supervisor's ability to monitor all coaches as needed)

(10) Access to Trip Planning Data (this may be accomplished by providing Road Supervisors with Internet access to the Community Transit web site)

(11) Access to trespass information and photos

(12) Access to Customer Service data

(13) Systemwide timetables

(14) Stop servicing display indicating schedule adherence and next bus arrival by stop.

ZZZ. The CAD system shall be capable of displaying timed transfer points, associated vehicles, and associated routes/trips.

AAAA. The CAD system shall include the ability to alert dispatchers when a timed transfer will be missed and a decision is needed.

BBBB. The CAD system shall automatically forward an operator's request for a "hold" for a timed transfer to await arrival of another vehicle. The amount of hold time shall be configurable within the system. The CAD shall forward this hold to the appropriate vehicle at the transfer point with the approval of the dispatcher.

CCCC. The CAD system shall allow system administrators to add, modify, or cancel timed transfer holds.

DDDD. The CAD system shall include functionality for the display of multiple screens from multiple dispatch workstations on a large screen or video wall display.

EEEE. The CAD system shall enable dispatchers to monitor platform hours in real-time. This data shall be captured and archived.

FFFF. The CAD system shall enable dispatchers to monitor revenue hours in real-time. This

data shall be captured and archived.

GGGG. The CAD system shall provide Dispatch with automated information regarding the coordinates of vehicles parked at the yard. This information shall be accurately & automatically communicated to the Trapeze Yard Management software, which will convert GPS coordinates to specific information such as parking space number.

HHHH. The CAD system shall include a data interface for transit traveler information systems including next bus arrival information signs at stops, Internet-based real-time bus arrival and display systems, and interactive voice response systems keyed to specific stops. The interface shall supply data in an XML format which shall include at a minimum:

(1) Real-time vehicle location information (absolute or relative to stops) along with coach ID, route number, trip number, and trip number

(2) Real-time schedule variance

(3) Transit system time

(4) Service changes, re-routes and suspensions

(5) Delays or disruptions noted by dispatchers.

IIII. The Contractor shall supply an Interface Control Document describing the data and message format, content ranges the agency with details of the format and structure of this data for integration with other systems. Community Transit shall have full rights to release this information to third party Contractors.

JJJJ. The Contractor shall also supply Interface Control Documents for the following:

(1) All proposed interfaces and integration with scheduling software and systems

(2) Interfaces to the current transit signal priority system

(3) All proposed or required interfaces with existing reporting and management systems.

KKKK. The Contractor shall supply database structures and format documentation for the CAD system.

LLLL. The CAD shall allow for routes or route variants to be designated as transit signal priority “allowed” or not “allowed” with the ability to set separate “late” thresholds by each route or route variant. This information shall interface with the TSP system described in Attachment 2.

MMMM. In addition to mechanical incident forms, the CAD shall support up to five other incident or event form types that shall be custom developed or configured to match Community Transit’s operational needs.

NNNN. The design of incident forms (draft and final) shall be prepared during the Preliminary and Final Design stages, and refined following initial operations based on actual experience and feedback from Community Transit dispatch staff.

OOOO. The CAD shall include functionality to create forms either automatically through a system event or message, or by a dispatcher by selecting a vehicle from a map, route, or block-based view.

PPPP. The CAD shall include functionality to re-open forms to add additional information regarding an incident or event. Each form shall contain a time/date/user stamp to note such information related for creation and with each set of edits.

QQQQ. Dispatchers shall be able to view forms based on type, time period, vehicle association, or route with a quick view list for forms that have been active for that operating day.

2.07.02.03 COMPUTER AIDED DISPATCH – PARATRANSIT

A. The system shall integrate with Community Transit's existing Trapeze dispatch system. Trapeze shall remain the primary dispatch interface.

B. The system shall generate and transmit to the PMDT manifest information that includes at a minimum the following fields generated by the Trapeze paratransit dispatching system:

(1) Activity type (pick-up or drop-off)

(2) Estimated time

(3) Appointment time

(4) Actual arrival and departure times

(5) Odometer reading

(6) Address of pick-up or drop-off

(7) Location description (such as the name of the business or organization)

(8) Comments

(9) Thomas Brothers map book page number

(10) Client name

(11) Client ID number

(12) Client mobility codes

(13) Service type (Curb or Door)

(14) Fare type

(15) Fare paid

(16) Pass type

(17) Space type (ambulatory or wheelchair class)

(18) Number of companions and attendants

(19) The manifest shall include entries for departing from and returning to the paratransit operating base

C. The system shall transmit individual trip assignments from the Trapeze system to PMDT units before the service day and as actions are taken in dispatch, with no additional keystrokes required by dispatchers.

D. The system shall transmit trip insertions or cancellations from the Trapeze system to PMDT units as these actions are taken in dispatch, and with no additional keystrokes

required by dispatchers. The operator shall receive a visual and/or audible alert when changes to the manifest/schedule have been received.

E. The system shall transmit the entire Trapeze comment field to the PMDT, to give the operator special information regarding a stop or a passenger, for example, requirements for custody of the passenger, instructions for finding a particular stop location, or other information.

F. The system shall allow dispatch to approve out-of-order stop instructions.

G. The system shall notify the operator of a new trip order or revised order or other dispatch message which requires positive acknowledgment by the operator within "n" stops of current location.

H. The system shall allow dispatch to transmit traffic condition and/or weather information to a single vehicle, the entire fleet or to vehicles within certain areas.

2.07.02.04 DESKTOP DISPLAY SYSTEM

A. The CAD system shall include a desktop display system that allows any authorized user within Community Transit to have read/view/query/report access to the fixed route dispatch displays, preferably using a browser-based system.

B. The Desktop display shall also be available to Community Transit contract operators at Kasch Park and Senior Services over the APTS network.

C. The read/view/query functions shall function the same as, or materially similar to, those features on the dispatch workstations. Users shall have the capability to select routes, groups of routes, route variants, specific trips and geographic areas to directly view the operation and performance of coaches on those routes.

D. Filters shall be provided to filter out certain information (e.g. operator information) from specific users, based on their level of access. A minimum five levels of access shall be provided.

E. The desktop display system shall also include "dashboard" presentation of route or system performance including schedule and headway performance.

F. Licenses shall be provided for up to 40 users including Directors, Managers/Assistant Managers, Transportation Planners, Operations Analysts, Assistants, and Customer Service staff.

G. In its Proposal, the Contractor shall describe its proposed approach to providing this functionality, and identify whether it can be provided on existing Community Transit desktop computers (on the Community Transit corporate LAN), or whether separate workstations are required. If the latter, the Contractor shall identify any assumptions regarding the provision of those workstations in its price Proposal.

2.07.02.05 REPORTS

A. The Database and Reporting Subsystem (DRS) shall provide data to assist in required reporting:

(1) DRS shall store and provide information required for reporting from contract

operators to Community Transit.

(2) DRS shall store and provide information required for reporting from Community Transit to Sound Transit.

(3) DRS shall store and provide information required for reporting to the Federal Transit Administration, such as National Transit Database reports.

B. For National Transit Database (NTD) Reporting purposes, APTS data and reports shall provide for an accurate and complete accounting of:

(1) Service Supplied Statistics:

i. Scheduled vehicle revenue-hours and revenue-miles, aggregated to the trip- and route-level for all revenue trips

ii. Actual vehicle revenue-hours and revenue-miles, aggregated to the trip- and route-level for all revenue trips

iii. Actual vehicle hours and miles (also known as platform hours and miles), for all revenue and non-revenue trips, the latter of which includes pull-in, pull-out and deadhead trips

(2) Service Consumed Statistics:

i. Passenger-miles, aggregated to the trip- and route-level for all revenue trips

ii. Unlinked passenger trips, aggregated to the trip-level and route-level for all revenue trips

NOTES: *Revenue service statistics are the product of what HASTUS classifies as "In-Service" hours and miles and "Loading" and "Layover" hours.*

Service supplied statistics preceded by the word "Actual" involve service which was actually operated, not what was scheduled. Typically, Community Transit begins with revenue and non-revenue service which was scheduled to operate and makes adjustments to account for all added and missed service. These adjustments typically include service suspended by the Boeing plant closure due to holidays and occasionally labor strikes, the Holiday (H) designated trips in the schedule which do not operate on holidays, the trips added to serve the Evergreen State Fair, and service associated with missed trips (or portions thereof) due to mechanical failure, manpower shortage, accidents, weather, etc. From time to time, there may be other types of added and/or missed service which will need to be accounted for.

HASTUS service levels are updated at least every service change and minor changes can occur during shake-ups between service changes. For the 2006 NTD Report, there were 42 days operated at the Sept-05 service levels, 224 days at the Feb-06 service levels, and 99 at the Sept-06 service levels. The service supplied and service consumed statistics need to be reported by annual totals and by day type (average weekday, average Saturday and average Sunday). The service consumed statistics also need to be compiled by time period, i.e., AM peak, PM peak, Off-Peak and Other periods, which need to be user-configurable.

Holidays typically get reported in the Sunday category as that is the service level typically offered on holidays; however, on occasion holidays are operated at a Saturday service level so there is a need for flexibility.

As there will be 100 percent APC deployment and as the most recent NTD Reporting Manual stipulates, "If available and reliable, 100 percent counts of either or both passenger miles (PM) and unlinked passenger trips (UPT) must be reported", the passenger-miles and unlinked passenger trips statistics will need to be derived from a census of all revenue trips

operated during the calendar year.

C. For National Transit Database (NTD) Reporting purposes, all data and reports shall distinguish between fixed-route service operated from the Merrill Creek base (Directly-Operated Motor Bus) and the Kasch Park base (Purchased Transportation Motor Bus). For the Kasch Creek base, all data and reports shall distinguish between fixed-route service operated for Sound Transit (i.e., the 500-series routes) and service operated for Community Transit (i.e., the 400-series routes).

D. DRS shall provide predefined reports enabling Community Transit to compare system performance against standard industry benchmarks.

E. DRS shall generate reports including, but not limited to:

(1) Stop-, trip-, variant-, and route-level boardings and alightings by location, specifying timestamp, trip number, and latitude/longitude for stop-level boardings

(2) Run times and stop- and segment-level load counts by trip

(3) Schedule performance exceptions

(4) Headway exceptions

(5) Transfer coordination performance

(6) Stops passed with no passenger activity on each trip

(7) Missed trips, including: time of missed trip, in-service miles and hours lost, and the cause of the missed trip

(8) Coaches operating off-route in the absence of a prescribed detour

(9) Accidents, incidents, and mechanical failures

(10) Platform hours

(11) Revenue hours, including in-service, loading, and layover hours

(12) Trip-level passenger-miles, schedule recovery time, and schedule deviation (on-time performance)

(13) Cumulative stop-to-stop and total trip-level mileage for revenue trips

F. DRS shall provide geographic related data that is compatible with Community Transit's ESRI based GIS.

G. DRS shall have the capability to export data at the lowest level through an Open Database Connectivity (ODBC) compliant query interface.

H. The parameters defining an "exception" (minutes early or late, minimum and maximum interval between coaches) shall be configurable by Community Transit personnel each time the report is generated.

I. The transfer coordination performance report shall track when timed transfers are met or missed. This report shall include transfers for all Community Transit routes, both local and commuter, including contracted services such as First Transit.

J. Off-route exception data shall include, at minimum:

(1) Route number, route variant number and trip number.

(2) Beginning and end date and time of the off-route condition

(3) Route mileage missed while off-route

(4) Bus stop locations missed while off- route

(5) Coach Operator ID

K. Community Transit shall have the capacity to query off-route exception data by ranges of dates/times, day of week, route, route variant and trip number, coach operator, etc.

L. The system shall provide supervisors and dispatchers with the capacity to prepare electronic reports of accidents, incidents, and mechanical failures.

M. Accident, incident, and mechanical failure data shall include at a minimum:

(1) Route, route variant number and, trip number.

(2) Date and time of incident

(3) Type of incident

(4) Coach Operator ID

(5) Vehicle number

N. The DRS shall provide a means for Community Transit staff to develop and generate customized reports. It shall be possible for Community Transit staff to develop daily, weekly, monthly, quarterly, and annual customized reports. Contractor involvement shall not be required to generate new, customized reports. However, during training on reports development, the contractor shall assist Community Transit in the development of up to ten (10) custom reports (not duplicative of reports already provided).

O. The DRS shall provide a means for Community Transit staff to develop and generate customized database queries and exports. Contractor involvement shall not be required to generate new, customized reports and database queries and exports. These exports and queries shall provide access to all data collected by on-board systems thru DRS.

P. The system shall include the ability to record actual coach pull out times compared to the route's scheduled pull out time, and actual coach pull in time (at the end of the route variant and trip) compared to the route's scheduled pull in time. The system shall also document coach number, assigned route/route variant number, trip number, and coach operator name and run linked to the record of pull out and pull in times.

Q. The system shall have the ability to export pull out/pull in times to Trapeze OPS.

R. The CAD system shall provide report generation, analysis, viewing, file management, printing, canned reports, and ad-hoc queries.

S. Reporting functions shall be supported from all system workstations up to a minimum of 30 workstations.

T. All standard reports shall be easily accessed, viewed, and printed from workstations with reporting software by selecting the reports from a list, menu, or other standard windows method.

U. The CAD system shall include functionality for report generation in Microsoft Office format that allows a non-SQL (structured query language) trained transit staff person to:

(1) Generate new reports using CAD data

(2) Perform basic statistical analysis

(3) Analyze report data

(4) Develop graphs displaying information summaries from CAD

(5) Print reports

V. In addition to the reports noted in the requirements of the subsections below the Contractor shall assume that they will be required to develop 15 additional standard reports from the CAD data with information and formats to be defined by Community Transit.

W. The reporting function of the CAD system shall provide operator reports (set by start/end dates) to summarize:

(1) Operator assignments

(2) Vehicle assignments

(3) Block/route/route variant and trip assignments

(4) Any incidents and incident types

(5) On-time schedule performance

X. The reporting function of the CAD system shall provide vehicle reports (set by start/end dates) to summarize:

(1) Vehicle assignment

(2) Mechanical failures

(3) Block/run/route/route variant/trip assignments

(4) Any incidents and incident types

Y. The reporting function of the CAD system shall provide performance reports that summarize on-time performance by:

(1) Block, route, route variant and trip.

(2) Operator

(3) Geographic sub area

(4) Time of day, day of week, month of year, service or calendar day, and schedule day time (e.g. weekday, Saturday, Sunday, holiday)

(5) Stop, transit center, or other specific locations, including time points not located at stops or transit centers

Z. The reporting function of the CAD system shall provide reports on all historic emergencies and text messages developed in the CAD system.

AA. The reporting function for radio and text messages shall summarize and display all fields for all incidents within a selected time period.

BB. The reporting function for radio and text messages shall allow separate views and summaries for reports by message types (including emergency calls) noting the start time, end time, and resolution.

CC. The reporting function of radio and text messages shall indicate time from initiation of the message by a operator to the response to that message by the dispatcher – separated by dispatcher.

DD. The reporting function of the CAD system shall include diagnostic reports on system performance for each server and application process comprising the CAD system.

EE. The reporting function of the CAD system shall log and summarize system faults by type, time of day, and duration.

FF. The reporting function of the CAD system shall log and summarize communications activities and interruptions between the CAD system and the vehicles.

GG. The system shall provide the ability for dispatchers, supervisors, and managers to "replay" stored CAD/AVL data. Replay shall include selection and replay of multiple vehicles simultaneously and shall provide all status, incident reports, and location data associated with the vehicles for the replay period.

HH. The system shall record a minimum of 90 days of stop level detailed vehicle location and schedule performance data for queries, analysis, and replay of recorded AVL data to investigate complaints or reported incidents. Recorded data must include the route, route variant, trip number, time, date, calendar and service day, coach ID, operator name, coach number, arrival and departure times, miles traveled, any deviations from normal routing, the speed of the coach, and passenger load count data. Data shall be archived no earlier than 90 days.

II. The system shall record the pull-out and pull-in times, and the deviation from the scheduled times, of all trips departing or arriving at bases and layover points.

JJ. The system shall be capable of storing at least five years of archived summary and reporting data on route and system performance. The archived data shall be stored in an ODBC compliant database. Required summary data include:

(1) Coach number

(2) Operator ID

(3) Operator name

(4) Arrival and departure info at the start and end of each trip

(5) Total passenger count and peak loading for each trip

(6) Pull-out and pull-in time at the transit base

(7) Number of miles traveled (disaggregated by in-service, deadhead, pull-in, and pull-out miles)

(8) Route and Trip

KK. The DRS shall include an interface to HASTUS for the export (in HASTUS ATP and Rider compatible formats) of operational performance (boardings, travel times, stops times, etc.) to HASTUS modules.

LL. The DRS shall provide functionality for the prescheduled "running" and conversion (to HTML format) of selected reports provided thru the CAD.

MM. The DRS shall provide functionality for the email distribution of selected reports in HTML format to a predefined email list of Community Transit staff.

2.07.02.06 TRAVELER INFORMATION WEBSITE

A. The Traveler Information System shall include an interactive web site for fixed-route services.

B. The design and development of the web site shall be coordinated with Community Transit marketing and customer service representatives, and shall have a consistent look and feel with other Community Transit web sites.

C. The web site shall be designed to be "windowed" in an existing Community Transit web site, or linked to as a separate series of pages from an external web site.

D. The web site shall include the capability to display a system map showing bus routes and the real-time locations of buses along these routes.

E. The web site shall be fully compliant with open standards for compatibility and accessibility. The web site shall be fully accessible to persons with disabilities, including blind users. It shall not require a specific type of device, operating system, or browser.

F. The web site shall have the capacity to display the expected arrival time, based on real-time AVL data, of the next two coaches on each route, at any published time point and at any stop along a route.

(1) This feature shall be accessible to XHTML(eXtensible HyperText Markup Language)-based mobile web browsing devices (such as wireless phones and PDAs) in addition to desktop and laptop computers.

(2) This feature shall be accessible via a simple URL (Uniform Resource Locator, for example, tracker.commtrans.org).

(3) Customers who have the Stop ID number available shall be able to look up bus arrival times using a single step.

G. A prototype or mockup of the web site shall be provided at final design review. The Contractor should anticipate multiple iterations of changes (minimum four iterations) to the look and feel of the website both before and after it goes live.

2.07.02.07 SOUND TRANSIT TRAVELER INFORMATION INTERFACE

A. Sound Transit will be installing roadside variable message signs (under a separate contract) at transit stops and stations to display next bus arrival information for all Sound Transit branded coaches, including those operated by Community Transit and equipped with APTS.

B. Sound Transit will also be generating next bus arrival information for coaches operated by King County Metro and Pierce Transit that may need to be displayed on roadside signs procured under this APTS contract and operated by Community Transit.

C. The generation of next bus arrival information will be through a third party application known as "MyBus" and operated by the University of Washington. Overview and technical information regarding this application is available at www.mybus.org.

D. The Contractor shall familiarize itself with the MyBus application and the requirements for integration, describe their proposed approach to integration in the Proposal, and discuss their approach at any interview sessions conducted as part of the evaluations and negotiations process.

E. The Contractor shall provide an external interface to the MyBus application comprised of three components:

(1) A real-time or near real-time function that transmits vehicle location information from the APTS to the MyBus predictive algorithm. Data (messages) shall be transmitted on a coach by coach basis to the MyBus application as the vehicle is polled. Data shall include at a minimum:

i. Vehicle Identification. The identification number of the coach.

ii. Block Identification. The identification of the piece of work that the vehicle is operating under.

iii. Route Identification. The identification number of the current route that the coach is on.

iv. Route Variant. The identification number of the current Route Variant or pattern that the coach is operating under.

v. Trip identification. The identification number of the current trip within the pattern that the coach is on.

vi. Heading. The current direction that the coach is traveling along the route (North, South, East, West) as defined for that route.

vii. Location. Latitude and longitude in decimal degrees.

viii. Location Time. The time that the location information was created, referenced to a specified datum.

ix. Vehicle Status. Whether the coach is in revenue service or out of revenue service, and on or off-route.

(2) A coverage data file that provides underlying information related to the service and network. The coverage data file shall exported to the MyBus application as there are changes to the service or network, and shall include at a minimum:

i. The Block Identification as defined above, representing the complete days Piece of work.

ii. All Pattern Identifications, Route Identifications, and Trip Identifications associated with the day's piece of work, including any interlined trips, and associated with the Block Identification.

iii. All timepoints associated with the routes, patterns and trips contained within the block.

iv. geocoded shape points that identify points of inflection or transition along a route (e.g. start/end points, turns, etc.)

(3) A real-time or near real-time function that can accept messages from the MyBus prediction system and display that information on signs provided under the APTS project . This is for Sound Transit coaches operated by King County and Pierce Transit that will not be part of the Community Transit APTS project, but that will have next bus information generated by the MyBus system for display on Community Transit roadside signs.

2.07.03 Performance Requirements

A. The system shall be designed for continuous operation without the need to manually "reboot" computers or devices. Scheduled automated reboots are acceptable, provided that such reboots shall not be required more than once in a 24 hour period.

B. System availability shall be 97% or better. For central systems, availability shall be determined by dividing total out-of-service time by total operating time. Out of service time shall include system maintenance that occurs outside of the normal maintenance window.

C. The central system and all CAD/AVL subsystems shall automatically recognize any stoppage, failure, or lock-up of a system process and automatically log the problem, attempt a restart, and notify dispatch.

2.08 ROADSIDE SYSTEMS

2.08.01 Smart Bus Stops

2.08.01.01 HARDWARE REQUIREMENTS

A. The Traveler Information System shall include Smart Bus Stops (SBS) located at major boarding points, transit centers, BRT stations, and park-and-ride facilities. With the exception of the BRT stops (all of which are to be equipped with SBS), no decisions have been made at this time by Community Transit as to which (if any) of the park-and-ride facilities or other locations will be equipped with SBS. This will be determined as part of negotiations with the preferred Contractor(s), or potentially after Contract award. For information only, a list of existing major and minor park-and-ride facilities that may be considered for SBS implementation is contained in Attachment 5.

B. SBS components shall include all components necessary to provide a fully functional system, including at a minimum:

(1) Variable message signs (VMS) to display bus arrival and other information.

(2) A speaker and tone generator, built into the variable message sign to provide

an alert to passengers waiting at the stop that a bus will be arriving soon.

(3) Wireless data communications modems to communicate with the central system.

(4) All electrical power supplies, cabinets, conduit, mounting hardware, mounting brackets, etc. required for installation and operation.

C. The VMS shall include functionality to display pre-set messages and/or real-time dynamic information including next bus arrivals to transit users.

D. The VMS shall be of a standard size and look at each stop, with the number of lines varying depending on the application. In its Proposal, the Contractor shall describe, identify the capabilities of, and price 1, 2, 3 and 4 line signs.

E. The VMS shall have the following technical features:

(1) Capability to display messages composed of any combination of alphanumeric character fonts, punctuation symbols and full graphics

(2) Inclusion of clock functionality

(3) Clearly legible under full range of ambient illumination conditions at full intensity from any viewing distance within 3 feet to 75 feet.

(4) Adequate line length to indicate service (ST or CT), route, and predicted arrival time for a single coach on a single line of the sign.

F. SBS components shall be designed to resist outdoor weather and vandalism.

2.08.01.02 FUNCTIONAL REQUIREMENTS

A. The VMS shall receive as input from the central system on an as-required basis:

(1) System management commands (e.g. system status requests, etc.)

(2) Static display information (e.g. hours of operation, bus routes, schedule, etc.)

(3) Real-time display information (e.g. schedule, next bus, etc.)

(4) Ad hoc information (e.g. time clock or advertisements, etc.).

B. The SBS shall have the capacity to display freeform alert messages entered by dispatchers (or, potentially, automatically generated by the Central System) to advise riders of service disruptions or reroutes. Such messages shall alternate or otherwise be displayed in concert with predicted arrival times, and shall not preempt the arrival time display unless there has been a complete disruption in service to the SBS location.

C. The system shall have capacity to store static messages in the VMS controller.

D. The sign controller shall allow a laptop computer to be connected locally through a dedicated external serial or similar communication method.

E. The SBS shall be able to display the predicted times of the next bus on each route serving the stop based on information transmitted from the central system.

F. When the bus arrival is within a designated number of minutes (to be a configurable

parameter), the SBS shall emit a tone or chime indicating that arrival is imminent.

G. The volume of the tone shall be settable on a stop-by-stop basis through configuration data transmitted from the central system, with a minimum volume of zero or “off”.

H. At a minimum, day and night settings for tone volume shall be included in the configuration data and the change shall occur automatically based on time of day.

I. Clock functionality shall be synchronized to the central system time, and shall be updated on a daily basis (minimum). Between update cycles, the clock shall have a cumulative drift of no more than 10 seconds.

J. Community Transit is interested in the ability of the SBS to display the predicted times of the next two buses on each route serving the stop. The Contractor shall indicate in its Proposal if this capability can be provided.

K. The SBS shall support up to four line electronic message signs.

L. Static information or a clock display shall be shown if communication link is lost.

2.08.01.03 COMMUNICATIONS REQUIREMENTS

A. The Contractor shall be responsible for providing the wireless communications infrastructure required to connect the SBS to the central system. In its Proposal, the Contractor shall describe the proposed communications methodology and costs (capital and operating).

2.08.01.04 PERFORMANCE REQUIREMENTS

A. Messages shall be displayed on signs within five (5) seconds of implementing a plan or selecting and implementing a predefined message. It shall be possible to configure the amount of time that a message shall be displayed.

B. Bus arrival times shall countdown in one (1) minute increments.

2.09 COMMUNICATIONS

2.09.01 Data Radio System

2.09.01.01 SYSTEM OVERVIEW

A. This section describes requirements for the data radio system and related equipment that will provide wireless data communications for Community Transit fixed route, paratransit and non-revenue vehicles. With the exception of selected manager vehicles equipped with Remote Dispatch Terminals, all communications shall be over the 700MHz digital radio communications infrastructure described herein. Communications with Remote Dispatch Terminals in manager vehicles shall be over commercial wireless carrier.

B. It is the intent of Community Transit to implement a radio communications infrastructure that includes the latest proven technology and that meets the specified

requirements for performance, coverage, and backup at a reasonable cost.

C. The radio system shall facilitate the efficient flow of data communications between the dispatch offices, the coach operators, and all other users, through the APTS. Data radio channel selection shall be automatically performed by the APTS, which shall automatically distribute the data traffic among the available data channels and shall use transmitter site steering to select base station sites to achieve maximum efficient use of channel capacity.

D. The following requirements are based on commonly accepted radio engineering principles, and are intended to provide the level of system performance anticipated for the APTS. The design includes the selection of several variables, including the radio system technology, base station sites, antenna patterns, and channel allocations. The Contractor shall be responsible for conducting engineering work required to confirm that their proposed solution will meet the requirements of this contract and the operation of their proposed system.

E. Contractors are permitted to submit other alternatives if it can be shown that an alternative provides equivalent or superior functionality at the same or lower overall cost. However, the Contractor shall be responsible for providing a radio system that ultimately meets all functional and performance requirements of this Specification, including coverage, regardless of whether the proposed radio system design reflects the conceptual design in terms of radio site selections and other system characteristics.

F. Any alternative radio communications proposals, including proposals that utilize public communications networks, shall meet all specified requirements. Of particular importance are requirements related to communications performance, coverage, and backup.

G. The proposal for any alternative that includes the use of a public network shall also include the total monthly lease cost for the use of the proposed network.

2.09.01.02 CONTRACTOR RESPONSIBILITIES

A. Under a separate contract, Community Transit will be installing 700 MHz communications infrastructure including base station antennas, transmission lines, transmitter combiners, receiver multicouplers, duplexers, racks and power systems in support of this Contract. Community Transit will also provide a T1 connection to each base site. This infrastructure will be made available to the APTS Contractor.

B. The Contractor shall engineer, furnish, and install a fully operational 700 MHz data radio system that utilizes, and is fully integrated with, the 700 MHz communications infrastructure to be supplied by Community Transit. In its Proposal, the Contractor shall described its proposed approach to integrating with this infrastructure, along with any assumptions regarding responsibilities for site preparation and installation.

C. The Contractor shall be responsible for the engineering, supply, installation, commissioning and testing of the following:

(1) 700 MHz mobile data radios and spares (a minimum of 10% spares unless otherwise noted in this Specification) for all vehicles except Managers vehicles.

(2) Interfaces with the VLU to provide control of the data radio.

(3) 700 MHz base stations at six sites.

(4) Connectors, jumper cables, interconnect wiring, and mounting hardware.

(5) Software.

(6) Connection to and integration with Community Transit-supplied infrastructure.

(7) Connections to the DC power supplies.

(8) Alarm notifications.

(9) Identification of Contractor-recommended spare components for base station maintenance.

D. If the proposed radio system design includes the use of receiver diversity in the base station equipment, the Contractor shall provide suitable duplexers at each base station site to allow the transmit antenna at each site to be used simultaneously as a second receive antenna to provide for the receive diversity function. Any duplexers supplied shall meet the following specifications:

TX Frequency Range	764-778 MHz
RX Frequency Range	794-806 MHz
Duplexer Type	Bandpass
Input VSWR	1.5:1 (maximum)
Average Power Input (TX side)	200 Watts (maximum)
Impedance	50 Ohms
Frequency Separation	30 MHz
Insertion Loss – RX to Antenna	1.2 dB (typical)
Insertion Loss – TX to Antenna	0.5 dB (typical)
Isolation – RX Carrier Suppression at TX	85 dB (minimum)
Isolation – TX noise suppression at RX	50 dB (minimum)
Antenna Output Connector	N-female
TX and RX input Connectors	N-female
Mounting	19” Rack Mount

E. The demarcation point between the 700 MHz system transmitting equipment provided under this specification and the existing antenna systems at each site shall be the two 700 MHz input Type N connectors at the 700 MHz transmitter combiner. The Contractor shall provide ½’ superflexible jumpers with Type N male connectors between its base station equipment and the appropriate transmitter combiner input for each base station.

F. At all six sites, the demarcation point between the 700 MHz system receiving equipment provided under this specification and the existing antenna systems at each site shall be the two BNC output connectors associated with each base station receiver at the receiver multicoupler. The Contractor shall provide ½’ superflexible jumpers with Type N male and BNC male connectors between its base station receiver equipment and the receiver multicoupler at each site.

G. The Contractor shall describe the method proposed for assignment of channels and

distribution of data traffic among available channels and base station sites. This channel assignment function shall be automatic and shall not require the manual intervention of a user under normal conditions.

H. The Contractor shall be responsible for integrating the data radio system with all other APTS components supplied under this Contract in a manner that meets the requirements of this Specification, and shall be responsible for integration with the microwave communications system.

I. The Contractor shall conduct site visits and provide close coordination and technical support as necessary to ensure that the design and functions of the radio system meet the specified requirements.

J. The Contractor shall coordinate with Community Transit representatives for all work at the Community Transit Merrill Creek and Kasch Park facilities, and at any of the remote repeater sites in the new data radio system

K. The Contractor shall provide engineering data and services, as required by Community Transit, regarding the necessary site preparations, facilities, field installation, and solutions to technical problems related to the Contract, throughout the design, implementation, installation, and testing phases through Final Acceptance.

L. The Contractor shall be responsible for ensuring that the equipment, materials and installation comply with all applicable FCC rules and regulations, with the provisions of the NEC, OSHA (Occupational Safety and Health Administration), and all local electrical, fire, and building codes, and with local seismic requirements for the zone in which the equipment will be installed (Seismic Zone 4).

M. The Contractor shall be responsible for providing electrical connections to existing commercial and emergency power supplies and outlets and any required upgrades to electrical panels required to provide such connections. The Contractor shall advise Community Transit of any electrical work that may be required to distribute backup power to the proposed equipment (as a result of site inspections). This includes details such as the number of additional outlets and capacity (in amperes).

N. The Contractor shall be responsible for advising Community Transit of any additional equipment or tower space required. This includes details such as rack footprints, height, and clearance.

O. The Contractor shall be responsible for advising Community Transit of any environmental requirements such as air conditioning, heating, ventilation, grounding, and security.

P. The Contractor shall be responsible for providing necessary maintenance equipment and spare parts as specified herein.

2.09.01.03 GENERAL DATA RADIO REQUIREMENTS

A. Equipment shall comply with all applicable standards for public transit radio communications systems, specifically including the following:

(1) FCC rules and regulations, CFR 47 Part 90, Part 100 and Section 1.1307

(2) TIA(Telecommunications Industry Association)-EIA-603 standards and

specifications

(3) MIL-STD-810E (Military Standard, for mobile radios) for vibration, shock, rain, salt and dust

B. Components shall operate within the manufacturer's specified limits under all reasonably expected operational conditions.

C. Equipment shall be capable of operation on 25 kHz or 12.5 kHz narrowband digital 700 MHz channels selected on a channel-by-channel basis. 25 kHz narrowband channels are contemplated in the system conceptual design and in the system FCC license; however, data radios operating on 12.5 kHz narrowband channels may be used in lieu of the 25 kHz radios. In the event that 12.5 kHz radios are used, Community Transit will be responsible for the modifications required for its 700 MHz FCC license.

D. The Contractor's Proposal shall include options for system configuration with 12.5 kHz channels and with 25 kHz channels, with appropriate 700 MHz base station and mobile radio equipment included for both options. The cost of both base station radios and mobile radios shall be provided as a separate line item for each option.

E. The Contractor shall certify that all equipment proposed has received the requisite approvals (i.e. Equipment Certification) from the Federal Communications Commission at time of Proposal.

F. All electronic equipment shall be fully solid-state, with the exception of any required relays, which shall be sealed.

G. All equipment shall be equipped with lightning and surge protection, as appropriate, and shall be properly grounded.

H. All equipment supplied shall be equipped with adequate fuses and/or circuit breakers, with time delay as applicable.

I. All fixed-site radio equipment shall be mounted in EIA-standard, 19-inch, open-faced racks as supplied by Community Transit.

2.09.01.04 BASE STATION REQUIREMENTS

A. One base station at each site shall be equipped with an automatic station identifier to transmit the FCC call sign using Morse code at intervals of not more than 30 minutes in accordance with FCC rules. The identifier shall be programmable for speed and level. Identification shall be sent without coded-squelch encoding. The identifier shall be "polite," such that it begins during an interruption in radio traffic and, if interrupted, resets and attempts to send again until such time that the complete message has been sent.

B. A metering package common to all the base stations at each site shall be provided. This includes a local speaker and volume control to monitor all on-channel signals.

C. Base stations shall be equipped with a carrier-operated relay module, if available as a standard option.

D. Base stations shall be frequency-synthesized and field-programmable. The Contractor shall provide two sets of any necessary software, interface devices, and

cables.

E. Transmitter and receiver modules shall be interchangeable between base stations.

F. Base stations shall be configured for operation from a nominal 12 VDC battery plant.

G. Transmitters shall be capable of providing sufficient power to produce the licensed ERP level while operating at 80% of their rated maximum output power.

H. Transmitters and receivers shall be capable of being reprogrammed in consecutive 12.5 kHz steps to comply with frequency and modulation requirements of 700 MHz 12.5 kHz or 25 kHz aggregated narrowband channels.

I. The minimum required technical specifications for base station transmitters measured in accordance with TIA/EIA-603 procedures are as follows:

Base Station Transmitter Specifications (25 kHz Bandwidth Base Stations)	
Frequency Range	764-776 MHz
Programmable Channel Steps	25 kHz
RF Power Output	25 W, ±1 dB; Up to 50 Watts with external
Intermodulation Attenuation	50 dB
Transmit Attack Time	less than 5 ms
Spurious and Harmonic Emissions	-80 dBc
Interface Connection	RS232 Serial or RJ45 Ethernet 10 Base T
Duty-cycle Rating	Continuous (100%) EIA
Environment	-30°C to +60° C
Power Requirements	13.8 VDC ±20%, 10 Amps Maximum
Emission Designator	20K0F1D
RF Output Impedance	50 Ohms
Oscillator Frequency Stability	0.1 ppm, -20°C to +60° C (with external reference if required)
Audio Distortion	Maximum 3% @ 1000 Hz, @ 66% of full
FCC Equipment Certification	FCC Part 90

Base Station Transmitter Specifications (12.5 kHz Bandwidth Base Stations)	
Frequency Range	764-776 MHz
Programmable Channel Steps	12.5 kHz
RF Power Output	50 W, adjustable down to 5 W
Intermodulation Attenuation	50 dB
Spurious and Harmonic Emissions	-80 dBc

Adjacent Channel Power	<-60 dBc (IS-102)
Duty-cycle Rating	Continuous (100%) EIA
Environment	-30°C to +60° C
Power Requirements	13.8 VDC
Emission Designator	8K10F1D
RF Output Impedance	50 Ohms
Oscillator Frequency Stability	0.1 ppm, -30°C to +60° C without external
Modulation Fidelity	<3% (TIA-102A)
Audio Response	Within +1, -3 dB of output level at 1 kHz (EIA)

J. The minimum required technical specifications for base station receivers measured in accordance with TIA/EIA-603 procedures are as follows:

Base Station Receiver Specifications (25 kHz Bandwidth Base Stations)	
Frequency Range	794-806 MHz
Programmable Channel Steps	25 kHz
Input Impedance	50 Ohms
Frequency Stability	0.1 ppm, -20° to +60° C without external
Sensitivity -- 12 dB SINAD	0.35 µV, -116 dBm with a 1.0 kHz test
Adjacent Channel Rejection -- 25 kHz	?? dB
Intermodulation Rejection – 25 kHz	85 dB/85 dB
Spurious and Image Rejection	100 dB
Audio Distortion -- 25 kHz	Maximum 3% @ 1000 Hz, @ 66% of full
Interface Connection	RS232 Serial or RJ45 Ethernet 10 Base T
Environment	-30°C to +60° C

Base Station Receiver Specifications (12.5 kHz Bandwidth Base Stations)	
Frequency Range	794-806 MHz
Programmable Channel Steps	12.5 kHz
Input Impedance	50 Ohms
Frequency Stability	0.1 ppm, -30° to +60° C (with external reference if required)
Digital Sensitivity – (5% BER)	0.21 µV (-120.5 dBm) at 77ºF. at center of switching range
Adjacent Channel Rejection -- 12.5 kHz	85 dB (ANSI/EIA-603)
Intermodulation Rejection --12.5 kHz	85 dB

Spurious and Image Rejection	100 dB
Audio Distortion -- 25/12.5 kHz	Maximum 3% @ 1000 Hz, @ 60% of full
Environment	-30°C to +60° C

K. Base stations shall be equipped with visual indicators and contact outputs indicating, at minimum, malfunctions in loss of audio or data, transmitter output power, synthesizer condition, and AC battery power supply status. These shall be input to an alarm system.

L. An alarm monitoring, control, and transmission system shall be provided to route base station operating condition indicators and alarms to the IT help desk in the Community Transit Administration Building via the alarm inputs and outputs that will be available on the new microwave radio system. Visual alert indications shall appear at the Help Desk positions and the indication and alarm status of the base station equipment shall be shown on a display at the Help Desk.

M. Each base station shall allow local control using a common test set. At minimum, the test set (or base station equipment) shall provide the following controls and functions for local operations:

(1) Transmitter keying and modulation

(2) Local receiver audio volume

(3) Receiver carrier squelch control

(4) Base station disable

(5) Transmitter disable - effective in all modes of operation

(6) Line input/output disable switch for testing purposes

(7) Local control functions that could cause service interruptions shall be equipped with visual indicators

N. Base stations shall be equipped with visual indicators and Form “A” contact outputs indicating, at minimum, malfunctions in loss of data, transmitter output power, synthesizer condition, and DC battery power status

O. Base station receivers shall be arranged for both tone control and E&M lead signaling into comparators.

2.09.01.05 MOBILE RADIO HARDWARE SPECIFICATIONS

A. The radio and associated hardware shall meet specifications under ambient conditions of -20° to +60° C, and 5% to 90% relative humidity.

B. The radio shall meet specifications when operating between 11 VDC and 15 VDC, negative ground

C. The radio shall meet all specifications, including oscillator stability, within 3.5 seconds of turn-on.

D. The radio shall meet MIL-STD-810E for vibration, shock, rain, salt and dust.

E. Cable connectors shall be securely attached to the mobile via hermetically sealed

connectors.

F. Fuses or circuit breakers installed in coaches/vehicles shall be easy to reach, labeled "DATA RADIO", and have the proper replacement fuse amperage identified.

G. One spare fuse for each mobile installation shall be provided.

H. The radio shall not receive or transmit ignition noise, alternator whine, or other forms of interference. The Contractor shall be responsible to equip radios with noise-reducing hardware and/or redesign installation wiring to eliminate interference problems.

I. The radio shall be a 100% solid-state, frequency-synthesized FM unit designed for reliable, long-term usage under adverse public transit conditions.

J. The radio shall be capable of conventional repeater operation or talk-around on any of the primary frequencies in the 764-806 MHz land mobile band.

K. The receiver selectivity and transmitter voice frequency response, deviation, and transmit power shall be automatically controlled by an internal microprocessor, based on the transmit and receive frequency selection. It shall not be necessary to program these parameters for each radio frequency.

L. The radio shall employ receiver circuitry to detect drop-out of the repeater transmitter, such as digital or continuous tone-coded squelch.

M. The radio shall incorporate carrier squelch as well as EIA standard analog Continuous Tone-Controlled Squelch System (CTCSS) and Digital Coded Squelch formats. The radio shall be equipped for "AND" squelch operation.

N. Coded squelch encode and decode tones shall be channel-slaved, and the radio shall be capable of operating with encode tones that are different from the receiver decode tone.

O. The port on the radio to be used for programming shall be accessible without requiring the removal of equipment from the mounting brackets.

P. The radio shall exhibit not less than 35 dB signal-to-noise ratio when installed and operating as a system.

Q. The radio shall be protected against damage in the event of DC power lead reversal or over voltage.

R. Internal batteries shall not be required to maintain the radio personality.

S. Data channel selection shall be performed automatically by the CAD/AVL system.

T. The minimum required technical specifications for mobile radio transmitters measured in accordance with TIA/EIA-603 procedures are as follows:

Mobile Radio Transmitter Specifications (25 KHz Bandwidth Radio)	
Frequency Range	764-806 MHz

Programmable Channel Steps	25 kHz
Power Output	25 W ±1dB
Frequency Stability	2.5 ppm, -20°C to +60° C
Duty Cycle Rating	Intermittent (20% Tx)
RF Output Impedance	50 Ohms
Emission Designator	20K0F1D
Spurious and Harmonic Emissions	-85 dBc
Distortion	Maximum 3% @ 1000 Hz @ 66% rated

Mobile Radio Transmitter Specifications (12.5 KHz Bandwidth Radio)	
Frequency Range	764-806 MHz
Programmable Channel Steps	12.5 kHz
Power Output	25 W minimum; 40 W maximum
Frequency Stability	1.5 ppm, -20°C to +60° C
Duty Cycle Rating	Intermittent (20% Tx)
RF Output Impedance	50 Ohms
Emission Designator	8K10F1D
Spurious and Harmonic Emissions	-85 dBc
Distortion	Maximum % @ 1000 Hz @ 66% rated

U. The minimum required technical specifications for mobile radio receivers measured in accordance with TIA/EIA-603 procedures are as follows:

Mobile Radio Receiver Specifications (25 KHz Bandwidth Radio)	
Frequency Range	794-806 MHz
Channel Spacing	25 kHz
Input Impedance	50 Ohms
Frequency Stability	2.5 ppm, -20°C to +60° C
Sensitivity, 12 dB SINAD	0.35 uV (116 dBm) for 12 dB SINAD with a 1 kHz test tone @ 66% rated modulation
Adjacent Channel Rejection -- 25 kHz	60 dB
Intermodulation Rejection -- 25 kHz	75 dB
Spurious and Image Rejection	75 dB

Mobile Radio Receiver Specifications (12.5 KHz Bandwidth Radio)	
Frequency Range	794-806 MHz

Channel Spacing	12.5 kHz
Input Impedance	50 Ohms
Frequency Stability	1.5 ppm, -20°C to +60° C
Sensitivity, TIA/EIA 102, 5% BER	0.20 uV (-121 dBm)
Adjacent Channel Selectivity -- 12.5 kHz	65 dB
Intermodulation Rejection -- 25/12.5 kHz	75 dB
Spurious and Image Rejection	75 dB
Audio Output Power	12 W minimum
Audio Distortion	Maximum 3% at rated output

V. Antennas shall meet the following requirements:

(1) Revenue Vehicles – MAXRAD MLPV740NGP, or Community Transit-approved equivalent

(2) Non-Revenue Vehicles – 3 dB gain collinear whip antennas, elevated feed if trunk mounted, or Community Transit-approved equivalent

W. Antennas shall meet the following minimum characteristics:

Mobile Antenna Specifications	
Power	40 W
Gain -- Revenue/Non-Revenue	3.0 dB/3.0 dB
Bandwidth	20 MHz
VSWR	1.5:1 maximum
Impedance	50 Ohm nominal

X. The top of the antenna shall not exceed 14 feet from the ground. For double-decker coaches, the antenna shall be installed in a location other than the roof.

Y. Antenna installation on vehicles with fiberglass tops will require the addition of a ground plane to be supplied by the Contractor, and installed either by the Contractor or by Community Transit vehicle maintenance staff depending on which entity has primary responsibility for installation of the onboard equipment.

2.09.01.06 FUNCTIONAL REQUIREMENTS

A. The data radio system described in these Specifications is intended to function as the part of the APTS system that connects the central CAD/AVL equipment to Community Transit's transit, paratransit, and other vehicles, as well as to fixed signs and other fixed facilities in some cases.

B. From the standpoint of the central CAD/AVL system the radio system shall provide a transparent channel or "pipe" over which the system data is transported to the remote vehicles and other remote equipment operating on the system.

C. Because the data radio system will be configured with two channels at six sites, and because simulcasting from all six sites with digital modulation is impractical due to the wide site spacing in the Community Transit radio system, channel selection and

transmitter site steering must be performed automatically by the overall APTS system.

D. Whether these functions are performed by network control equipment that is part of the data radio system or by the CAD/AVL central network equipment shall be determined by the integrated system design for the APTS submitted by each Contractor.

E. Each Proposal submitted to Community Transit in response to these specifications shall contain a detailed description of the methods and techniques that will be used to provide these channel selection and transmitter site steering functions.

2.09.01.07 PERFORMANCE REQUIREMENTS

A. The system described by this Specification is intended to provide reliable mobile data communications throughout the Community Transit service area with some allowance for expansion in certain areas. Areas shaded in yellow on the Service Area Map provided in Attachment 1 define Community Transit's service area, which is the primary area of required radio coverage. Criteria for coverage shall be as specified in Section 2.12.02.04 of this Specification.

B. Contractors shall provide, as part of the Proposal submitted in response to the RFP, detailed coverage maps showing the quality of coverage that is predicted for the Contractor's proposed radio system design. The coverage maps shall clearly indicate areas where reliable data communications are predicted for both talk-out (outbound data to vehicles) and talk-in (inbound data from vehicles). The Community Transit service boundary outline shall be used on all coverage maps provided with Proposals.

C. Radio coverage field testing shall be conducted over the entire service area as specified in Section 2.12.02.04, in order to verify that the radio coverage provided is sufficient to enable the APTS to meet all functional and performance requirements of this Specification.

2.09.02 Remote Data Terminal (RDT) Communications

2.09.02.01 RDT COMMUNICATIONS REQUIREMENTS

A. The Contractor shall supply a commercial high-speed wireless communications solution for communicating with Remote Data Terminals in selected Community Transit manager vehicles. In its Proposal, the Contractor shall describe the proposed approach and costs (capital and operating). Community Transit will pay the recurring charges associated with the commercial wireless service.

B. The communications system shall provide continuous connectivity throughout a coverage area that includes all Sound Transit routes operated by Community Transit (i.e. Snohomish County and the northern half of King County).

C. The high-speed wireless communications system may take the form of:

(1) Generalized Packet Radio Service (GPRS), used in Global Systems for Mobile communications systems (GSM)

(2) 1xRTT, used in Code Division Multiple Access (CDMA) systems

D. The Contractor shall furnish, test, and install all hardware, software, power and communications cabling necessary to ensure wireless connectivity.

E. The wireless communications system shall include a ruggedized antenna to be mounted externally on the vehicle.

F. The wireless modem shall have an RS-232 and/or USB interface as required to interface with the laptop computer-based RDT.

G. Wireless equipment shall meet the US Military and Society of Automotive Engineers J1455 specifications for vibration, shock and humidity.

H. In the event of signal loss, the communications system shall automatically re-acquire connectivity once the signal is re-acquired.

I. The wireless communications shall be used to download configuration data and software updates, and upload diagnostics and onboard system performance data to/from the RDT.

J. LED indicators shall be provided indicating:

(1) Power on/off

(2) Modem has/has not acquired data service (GPRS or 1xRTT)

(3) Modem is transmitting data

(4) Modem is receiving data

2.09.03 Wireless Local Area Network Communications

2.09.03.01 ONBOARD WIRELESS LAN COMPONENTS

A. The onboard APTS components shall be provided with an 802.11g based wireless LAN card.

B. Wireless LAN equipment shall be easily replaceable to accommodate changes in technology and wireless standards. An external or PCMCIA (Personal Computer Memory Card International Association) device may be used.

C. The wireless LAN card shall be connected to the exterior GPS antenna via appropriate cabling and connectors.

D. IP address space shall be as directed by Community Transit. Static IP addressing is acceptable.

2.09.03.02 TRANSIT BASE WIRELESS LAN

A. The Contractor shall provide fixed wireless LAN access points at the following facilities:

(1) Merrill Creek

(2) Kasch Park

(3) Senior Services (DART)

B. The wireless LAN access points shall be based on 802.11g technology, and shall be compatible with the wireless LAN cards on the coaches.

C. A sufficient number of wireless LAN access points shall be provided to provide a minimum 10mbs coverage throughout all coach parking areas and driveways. The Contractor shall be responsible for conducting wireless site surveys to confirm the number of access points required, and shall at assume for the purpose of the Proposal that two access points will be required at each site.

D. The Contractor shall be responsible for locating, installing and configuring the wireless LAN access points to provide required coverage and minimize interference. Channel selection shall be coordinated with the existing wireless LAN access points installed at Community Transit facilities.

E. Some DART vehicles park off-site, and do not drive to or near one of the three facilities identified above. In its Proposal, the Contractor shall identify an option or options for providing transferring data to these vehicles that would normally be transferred via the wireless LAN.

2.09.04 Temporary Communications – BRT Vehicles

2.09.04.01 REQUIREMENTS

A. Communications must be provided with BRT vehicles at the time such vehicles are placed into revenue service.

B. The Contractor shall include functionality in the system to provide temporary communications to BRT vehicles using a commercial wireless carrier in the event that the data radio system cannot be made fully operational in time for BRT service startup.

C. In the Proposal, the Contractor shall identify its preferred wireless carrier, and the provisions required to support temporary communications.

D. The Contractor shall include the price for all capital and startup costs associated with this temporary service. Community Transit will pay any monthly communications fees directly to the wireless carrier separately.

2.10 PRICED OPTIONS

Community Transit is potentially interested in implementing the following options. Contractors are invited to include in its Proposal proposed solutions and costs for the following system options. Although the primary evaluation of Proposals will be based on the ability of the Contractor to satisfy the core requirements of this specification, Community Transit reserves the right to consider any added-value of proposed options in making its final selection and/or negotiating with a preferred Contractor or Contractors.

2.10.01 Driver Display Unit (DDU) Integration

2.10.01.01 DESCRIPTION

Community Transit fixed route coaches, with the exception of BRT vehicles, will be equipped with Driver Display Units which act as the mobile data terminals for the smart card fare collection

system supplied by ERG Transit Systems.

Basic parameters of this device (illustrated below) are as follows:

- Primary processor: Intel PXA255 RISC CPU
- Operating System: Windows CE.net 5.0
- Screen size: Monochrome – ¼ VGA 320x240p
- Programmable Softkeys: 6 each side; additional 4 on the bottom for navigation
- Network interface: Ethernet 10/100 LAN
- Total Memory: 128MB; approximately 50MB for third party applications
- Audio: Internal speaker

The device is designed to accommodate multiple applications running independently, and through a series of screen and key templates can allocate screen space and key assignments to different applications.

For the smart card system, the DDU provides following functions:

- Operator logon/logoff, either manually (keypress entry) or automatically (through an operator smart card).
- Operator selection of starting block and trip.
- Local validation of operator ID, as well as block and trip assignments based on information provided by Community Transit's HASTUS scheduling systems.
- "Next trip" selection based on block and trip information stored in the system (the operator is required to manually select the next trip).

Operator ID, block and trip information is stored in a shared memory area of the device and thus is accessible to all applications running on the DDU. Control applications that reside on the device include an application manager, template manager (screens and key assignments), status and logging application and library, watchdog application and library, monitor application and library, and fare collection application.

As part of this Contract, Community Transit will supply development guidelines, a software development kit, and a development platform to the Contract. The Contractor will be required to coordinate with ERG Transit Systems on application development and testing.

Community Transit is interested in the potential to share logon and other data between the APTS MDT and smart card DDU to minimize operator keystrokes. This would not apply to BRT and DART vehicles as these are not equipped with the DDU.

Under this concept, integration would be as follows:

A. The DDU would act as the primary operator interface for logon, logoff, and trip change.

B. The MDT would include an interface to read operator ID, login status and data, and current trip information from the shared memory area of the DDU.

C. The MDT/APTS would independently verify operator ID, login/logoff status and current trip information, and shall indicate such information at dispatch.

D. The system would notify the dispatcher of a log-on or trip error, and dispatch staff shall have the ability to call the operator or send a text message to the operator to correct the information.

E. The MDT would include functionality to write updated trip information to the shared memory area of the DDU to accommodate automated trip changes generated by the APTS.

F. Onboard communications between the devices would be over the existing Ethernet network that was supplied by the smart card system.

2.10.02 Interactive Voice Response Phone System

2.10.02.01 REQUIREMENTS

A. The Contractor shall provide an Interactive Voice Response System (IVR) capable of operating with Community Transit's existing digital telephone system, as well as with a potential future IP-based system. The existing telephone system utilizes Avaya PBX switches, and is planned for replacement with a new IP-based system by 2010.

B. For fixed route services, the IVR shall be capable of providing the predicted arrival times of the next two buses on each route serving any published timepoint and at any bus stop in the system. For locations other than published timepoints, the system shall support customers entering a Stop ID number indicated on the bus stop sign.

C. For paratransit services, the IVR shall provide the following functionality:

(1) IVR shall include an interface with the Trapeze paratransit dispatching software, to provide pre-registered users with automated cancellation of paratransit trips by phone.

(2) IVR shall provide automated notification to paratransit riders when their vehicle is approaching and pick-up is imminent.

(3) IVR shall record whether or not a customer has been successfully contacted by the IVR. If the customer has not been contacted, the IVR shall call a secondary number (if available). The IVR shall record whether or not the customer was successfully contact at the secondary number.

2.10.03 Integration with Onboard Cameras

2.10.03.01 REQUIREMENTS

A. The Onboard System shall provide the capability for authorized users to view a live video feed of the existing onboard surveillance cameras (for example, in the event of an Emergency Alarm activation or other report of a problem on the coach). Note: the feasibility of providing live video feeds from coaches to Dispatch is limited by the availability of network bandwidth. However, there may be an opportunity to integrate onboard surveillance cameras with WLAN (Wireless Local Area Network) equipment.

B. Community Transit utilizes a Kalatel CCTV (closed circuit television) system.

2.10.04 Post-Warranty Maintenance

2.10.04.01 REQUIREMENTS

A. Community Transit is interested in options available from the Contractor for long-term maintenance of the APTS components. Contractors are requested to include in their proposal priced options for:

(1) General on-call software support.

(2) Ongoing software upgrades and maintenance.

(3) Onboard fixed-route equipment maintenance (assuming that basic diagnostics and remove and replace responsibilities would remain with Community Transit).

(4) Onboard paratransit equipment maintenance (assuming that basic diagnostics and remove and replace responsibilities would remain with the paratransit operator).

(5) Central site equipment maintenance.

2.11 INSTALLATION AND COMMISSIONING

2.11.01 General Installation Requirements

A. Unless otherwise specified, Contractor shall provide all materials, parts, interconnect cables and connectors, software, documentation, installation instructions, and commissioning instructions. This includes mounting brackets, stanchion extensions, hardware, cable labels, grommets, cable clamps and harnesses, and other materials required to install the equipment.

2.11.02 Installation Requirements

2.11.02.01 ONBOARD EQUIPMENT INSTALLATION

A. The Contractor shall conduct a survey of all Community Transit Coaches and configurations, and shall be responsible for preparing all power requirements, design plans, installation plans and instructions, fabrication plans, wiring diagrams, connection instructions, bills of materials, and commissioning and testing instructions for all coaches and individual configurations. For the BRT installations, such information shall be provided at or before the Preliminary Design Review submission and will be provided to the coach supplier to assist with their design, manufacture and configuration of the BRT coaches. For other vehicles, such information can be provided at the Preliminary or Detailed Design Review, depending on when the information is available.

B. The Contractor shall be responsible for vehicle preparation and the installation, commissioning and testing of all onboard APTS components for all paratransit vehicles. Community Transit will provide a work area and equipment storage area at these sites, or at one of the transit facilities.

C. For fixed route and managers vehicles, the Contractor shall describe and price two options:

(1) Option 1 where the Contractor is responsible for vehicle preparation and the installation, commissioning and testing of all onboard APTS components for all fixed route and manager vehicles. Community Transit will provide a work area and equipment storage area one or both of the transit facilities. The Contractor shall include in its Proposal any assumptions regarding the number of vehicles to be made available per day, expected person-hours to prepare and install equipment in a vehicle, and expected hours of work.

(2) Option 2 where Community Transit vehicle maintenance staff is responsible for preparing coaches and installing all onboard components for fixed route and managers vehicles operating out of the Merrill Creek facility, and potentially out of the Kasch Park facility. The Contractor shall be responsible for commissioning equipment, providing support during the installation process, and for certifying the acceptability of the installation work.

D. For all fixed-route vehicles, Community Transit will supply any “equipment boxes” required to house the APTS components on the coach. The Contractor shall be responsible for supplying any such boxes for paratransit vehicles. As part of the Preliminary Design Review submission, the Contractor shall provide any requirements for such equipment boxes.

E. For the BRT vehicles, the Contractor shall provide installation information as noted above, shall provide and install all equipment at the OEM vehicle supplier’s site, and shall be responsible for providing coordination and oversight required to certify that all equipment has been installed and tested correctly. In the event that the BRT OEM supplier wishes to use their own forces to install the equipment, the Contractor shall provide all equipment, wiring, tools, hardware, mountings, instructions, and training required, and shall remain responsible for certifying the installation. Such work shall be performed per the schedule outlined in Section 2.02.03B.

F. All equipment shall be installed in a manner that allows for simple replacement by Community Transit maintenance personnel in the event of failure.

G. Equipment shall allow for easy installation/removal in transit vehicles through the doors without requiring door disassembly.

H. In-vehicle system devices shall be identical in installation characteristics across each coach type and model.

I. Equipment shall not pose a hazard to operators or passengers when operated in accordance with manufacturers’ recommendations.

J. Individual equipment components to be installed shall be capable of being carried by a single person, and as such, shall not exceed twenty-five pounds.

K. Equipment shall be able to be replaced in a vehicle in five minutes or less when the proper tools and a spare unit are available.

L. Unless otherwise approved by Community Transit, all connectors, fasteners and connection shall be water-tight and solvent-resistant.

M. All cables shall be fully labeled at both ends.

2.11.02.02 CENTRAL COMPUTER SYSTEM INSTALLATION

A. The Contractor shall be responsible for the installation, local configuration, network configuration, commissioning and testing of all central computer system equipment.

B. The Contractor, as part of the design phase, shall confirm the preferred locations for all central computer system equipment installation.

C. The Contractor, as part of the design phase, shall prepare design drawings, elevations and wiring connection diagrams illustrating the location of all central computer system and related components and their interconnection.

D. Community transit will provide power and a network demarcation point at all central computer system sites. The Contractor shall be responsible for any local cabling requirements to connect to the demarcation points.

E. Central Computer Aided Dispatch workstations, monitors and other related hardware shall be installed at:

(1) Merrill Creek – three (3) dispatch positions

(2) Kasch Park – two (2) dispatch positions

(3) Paratransit dispatch – two (2) dispatch positions

F. Dispatch consoles will be provided by Community Transit, and will be sized to accommodate the equipment specified herein. At this time, it is expected that Community Transit will be installing new dispatch consoles by June, 2008.

G. All servers and associated racks and other hardware shall be installed at a designated location at the Merrill Creek facility.

H. Community transit will provide access during normal business hours for installation work that does not disrupt normal operations. All installation and cutover work that disrupts normal operation shall be conducted at night, weekends or other off-hours per Community Transit approval.

2.11.02.03 ROADSIDE EQUIPMENT INSTALLATION

A. It shall be the responsibility of the Contractor to develop installation requirements for all roadside equipment including VMS, communications equipment, power supplies, enclosures, etc.

B. The Contractor shall be responsible for the installation, local configuration, network configuration, commissioning and testing of all roadside equipment.

C. The Contractor shall coordinate the installation of all roadside equipment with Community Transit. The Contractor shall also coordinate the design and installation of VMS signs with the designer and Contractor responsible for construction of the BRT stations and stops.

D. The Contractor, as part of the design phase, shall prepare stop/station design drawings, elevations and wiring connection diagrams illustrating the installation of all roadside components and their interconnection.

E. Community transit will provide power to the proposed location of the VMS.

F. The Contractor shall be responsible for providing all wireless communications and connections.

G. All roadside components shall be designed and installed to resist normal vandalism.

H. Roadside components shall be identical in mounting characteristics so that a specific piece of equipment shall be installable with minimal modification at any of the stops at which it might be used.

I. Equipment shall not pose a hazard to pedestrians when operated in accordance with manufacturers' recommendations.

J. All installation work shall be per electrical code.

2.11.02.04 COMMUNICATIONS SITES

A. The Contractor shall be responsible for the installation of all Contractor-supplied equipment, and integration, commissioning and testing of all data radio systems at remote sites, and the installation, configuration, commissioning and testing of any data radio system servers or other equipment at central sites such as Kasch Park.

B. The Contractor, as part of the design phase, shall prepare design drawings, elevations and wiring connection diagrams illustrating the location of all communications site equipment and its interconnection.

C. Community Transit will provide power demarcation point at each site (breaker panel). The Contractor shall be responsible for any local cabling requirements to connect to the demarcation point.

D. Community Transit will provide shelter and rack space at all sites. In the System Design Document, the Contractor shall identify all data radio system requirements including space and power requirements for servers, communications devices, any mounting requirements, power supplies, network connections, environmental requirements and any other minimum needs.

2.12 TESTING

2.12.01 General Requirements

A. The Contractor shall be responsible for conducting all testing as described herein. Work under this section shall include all labor, materials, and support services required to completely test all hardware and software.

B. If a type of equipment does not meet the specifications or requirements as stated in these Specifications or the System Design Document, it shall be the Contractor's responsibility to correct the problem in all units of that equipment furnished, at no additional cost to Community Transit.

C. All of the components, subsystems, interfaces and systems processes constituting the APTS shall be tested individually and together to demonstrate that they meet the

contract requirements and provide a system that functions in accordance with the contract.

D. The Contractor shall be responsible for the performance of all of the tests described below to satisfy the objectives of each testing phase as determined by Community Transit.

E. Community Transit shall have the right to witness any and all tests.

F. Test plans shall be submitted to Community Transit a minimum forty-five (45) days prior to the planned start of testing. Testing shall not commence until the plans have been approved.

G. Unless otherwise specified, all test plans shall include at a minimum the following:

(1) Overview of test including test objectives

(2) Pass/fail criteria

(3) Traceability matrix listing of all requirements and specifications from the Contract that are included/to be verified in the test and their cross-reference to the Specifications and System Design Document.

(4) Test setup and test measuring equipment (including descriptive diagrams)

(5) Listing of tools, test applications, simulators, etc. required to perform the test

(6) Entry/startup conditions

(7) Exit/closing conditions

(8) Test procedures and scripts to be executed

(9) Test recording form

(10) Test comments form

(11) Signatures and verification form

H. Community Transit reserves the right to direct, at no additional cost, the following changes to the test plans:

(1) The addition of procedural changes and other reasonable tests to reasonably assure System performance and conformance;

(2) Investigation into any apparent troubles or anomalies with respect to the System;

(3) An audit of all test reports and verification of any or all previous tests and measurements.

I. The Contractor shall provide written notification of readiness to test for all required test stages a minimum of two (2) weeks in advance of the testing.

J. Upon successful completion of any test, the Contractor shall prepare and submit within two (2) weeks a report summarizing the results with relevant test records appended. All such test reports will be reviewed by Community Transit.

K. With each vehicle installation, and immediately upon completion of the installation work, he Contractor shall test and demonstrate that the onboard system is fully

functional.

2.12.01.02 TEST SUSPENSION CRITERIA AND DEFECT RESOLUTION

A. All test failures, system defects, system errors, or missing functionality shall be recorded by the Contractor and assigned a “Defect Severity” rating as follows:

(1) *Severity 1: Required functionality is substantially not available; normal in-service operation of the device or subsystem cannot be maintained; or Community Transit transit operations are disrupted.*

(2) *Severity 2: Functionality is substantially available however one or more sub-functions are not operating as specified; full functionality is available but performance is not within specifications. Normal in-service operation can be maintained via a workaround.*

(3) *Severity 3: Minor software defect or usability problem for which there is a workaround.*

B. The Contractor shall maintain a database of and shall track the status of all defects.

C. Community Transit reserves the right to re-classify a defect severity based on the impact to system operation or transit operations.

D. Test continuation, suspension or restart shall be as follows:

(1) *Severity 1 Defect: Applicable test(s) shall be halted and restarted from time zero upon rectification of the Severity 1 defect. In the event that Community Transit operations are disrupted, all testing shall be suspended until the defect can be rectified.*

(2) *Severity 2 Defect: Applicable test(s) shall be suspended and restarted upon rectification of the Severity 2 defect.*

(3) *Severity 3 Defect: Testing may continue. Defect shall be noted in the comments section of the report.*

E. All Severity 1 and 2 defects shall be corrected prior to completion of the stage of testing where they were identified. Test results for that stage shall not be accepted until such time as the Contractor demonstrates that all Severity 1 and 2 defects have been resolved and tested.

F. Severity 3 defects may be carried forward into software or system modifications in the next stage of the project, and shall be demonstrated to be corrected in the next planned testing stage.

G. The Contractor shall develop and maintain a standard set of regression tests for each device or subsystem. Regression tests shall be run for any affected device or subsystem in the event that any testing is halted and restarted in accordance with the requirements of Severity 1 defect resolution.

2.12.02 Test Stages

2.12.02.01 TESTING STAGE 1: FACTORY ACCEPTANCE TESTING (FAT)

A. Factory Acceptance Testing shall be performed to ensure that the supplied and

developed components meet all functional and environmental requirements and specifications. Factory Acceptance Tests shall be performed at the Contractor's manufacturing or development site prior to any delivery of equipment to Community Transit. A Community Transit representative will be present during the FAT.

B. The Contractor shall develop a comprehensive FAT program consisting, at a minimum, of the following individual test programs:

(1) Hardware test to test the operating parameters of all equipment are per the Specifications of this Contract, OEM specifications, and System Design Document.

(2) Functional test to demonstrate that all functional and operational requirements and specifications applicable to the device/subsystem have been delivered.

(3) Environmental, electrical and electromagnetic tests demonstrating compliance with Contract and regulating agency requirements.

(4) Human factors test for all devices/subsystems with a user interface.

C. Additionally, for the data radio system, the following shall apply to the FAT:

(1) All tests shall be performed, "over-the-air", using mobile antennas.

(2) Fixed-end radio equipment shall be included in the factory test configuration using base station equipment for both data channels.

(3) Attenuation shall be added to the RF communications links with mobile units, such that the received signal level at either end of the link shall not exceed -87.8 dBm.

D. All equipment types shall be tested. A minimum of one (1) unit of each equipment type, identically configured to all other units of that same equipment type, shall be subject to the FAT unless waived by the Community Transit Project Manager.

E. Any device certifications required by regulatory agencies shall be the responsibility of the Contractor.

F. All required certifications shall be submitted with each shipment of devices or subsystems.

G. Any changes to the hardware configuration shall require a FAT retest.

2.12.02.02 TESTING STAGE 2: SYSTEM INTEGRATION TEST (SIT)

A. A System Integration Test (SIT) shall be conducted to verify that subsystem components, when integrated together, meet the system level functional requirements and specifications. SIT shall be completed prior to onsite installation of the system.

B. The Contractor shall be responsible for the provision of any SIT testbeds or bench test facilities, including any power supplies, simulators, or other components and software required to conduct the test.

C. The SIT configuration shall include all dispatch equipment and all other local and remote console equipment, all servers and all communication control equipment, a complete set of on-board vehicle equipment for at least three (3) revenue vehicles,

one (1) non-revenue vehicle, and one (1) manager vehicle (RDT). The SIT shall include all equipment and interfaces supplied by the Contractor under the APTS project, including any optional equipment selected by Community Transit for inclusion under this project. The SIT configuration shall also include all test equipment required to simulate data signals to and from devices noted in this Contract such as wheelchair lift/ramps, destination sign, bicycle rack, emergency alarm, etc.

D. The Contractor shall develop a comprehensive SIT program consisting, at a minimum, of the following individual test programs:

(1) System configuration

(2) Integrated operation of all devices and subsystems

(3) End-to-end connectivity and correct processing/handling of data and messages

(4) Scenario or use-case testing to demonstrate that all system-level functional and operational requirements and specifications have been delivered.

(5) As applicable, environmental, electrical and electromagnetic tests demonstrating compliance with Contract and regulating agency requirement in the integrated form of the system

E. The SIT shall include time and provisions for Community Transit staff to conduct independent system integration testing using their own or ad-hoc script and test cases. Contractor support during these tests shall be provided.

F. Transmitter steering shall be tested for the specific system design and for both data channels. Microwave and/or common carrier interconnections between the APTS network controller and the fixed base station radio sites may be simulated.

2.12.02.03 TESTING STAGE 3: ONSITE INTEGRATION TESTING (OIT)

A. Upon completion of the SIT, the Contractor shall demonstrate the integrated operation of all system components when installed at Community Transit.

B. The Contractor shall identify a subset of the System Integration Tests to be re-run at Community Transit once a limited number of vehicles have been equipped.

C. The OIT shall include time and provisions for Community Transit staff to conduct independent system integration testing using their own or ad-hoc script and test cases. Contractor support during these tests shall be provided.

D. Additionally, with respect to the data radio system, the following SIT requirements shall be met:

(1) Test transmission lines after they are installed on the tower and before they are connected to the associated antenna to confirm that insertion loss and VSWR (Return Loss) conform to the manufacturer's specifications. Provide written results for each test.

(2) Test antennas after they have been connected to their associated transmission line by sweeping each line for VSWR (Return Loss) over the specified bandwidth of the antenna. Perform the sweep test at the protected side of the surge suppressor associated with each antenna.

(3) Verify that omnidirectional antennas are plumb, and that directional antennas are oriented as specified elsewhere in this specification or on drawings.

2.12.02.04 TESTING STAGE 4: RADIO SYSTEM COVERAGE TESTS

A. Radio system coverage tests shall be conducted in parallel with the SIT to confirm that the data radio system provides reliable communications coverage and performance for two-way data transmission for mobile radios at all outdoor locations throughout Community Transit's service area.

B. Test plans and procedures shall be developed by the Contractor and submitted to Community Transit for approval as part of the SIT.

C. General coverage areas to be tested shall include the area covered by Community Transit fixed route routes. Areas of water are not included in the general coverage area requirements. At least 95% of test cells in each general coverage area shall pass the test.

D. At least 90% of the test points in each specific coverage area shall pass the test.

E. The measured signal levels required for the data channels shall be adequate to achieve data reliability necessary to support the delivered APTS operating at performance levels specified elsewhere.

F. At each test location, the radio channel used to test shall be randomly selected from the two installed RF channels.

G. As a component of the test plans and procedures, the Contractor shall describe, in detail, its methods for determining the level of data reliability necessary for the data channels in order to support the APTS and, in turn, the measured signal level that is necessary to achieve the required level of data reliability. The approved signal level shall then be used as the criteria for subsequent received signal strength coverage testing for the data channels.

H. The Contractor shall execute the radio coverage tests according to the following procedures:

(1) The tests and test criteria shall conform to the techniques and criteria described in WIRELESS COMMUNICATION SYSTEMS; PERFORMANCE IN NOISE- AND INTERFERENCE-LIMITED SITUATIONS; RECOMMENDED METHODS FOR TECHNOLOGICALLY-INDEPENDENT MODELING, SIMULATION, AND VERIFICATION; TSB (Telecommunications Systems Bulletin) 88B; Telecommunications Industry Association.

(2) The required general coverage areas shall each be divided into a uniform grid pattern of test cells. The number of test cells and the size of each cell shall be determined following the procedures shown in Sections 8.2 through 8.5 of TSB-88B. At a random location within each test cell (along a bus route if possible), a minimum of 200 signal-level samples shall be taken over a distance of not less than 40 wavelengths. The measured signal level shall be the median of the sample levels. TSB88-B defines a service area as a boundary of the geographic area of concern for a user or user agency, and states that validated service area reliability shall be determined by the percentage of test locations in the service area that meet or exceed the specified CPC (Coverage Performance Criteria).

(3) RF coverage for the Community Transit APTS system shall be verified by measuring data message success rate throughout Community Transit's defined bounded service area, using mobile radios in motion along a drive test route within the service area. The drive test route shall pass through all of the test grids determined to be accessible for coverage tests. The coverage acceptance test shall record measured received signal strength, as described above, and shall perform actual data calls on the system, as described in the next section. In order to pass the received signal strength coverage test, the measured median signal strength recorded for each test tile must equal or exceed the approved threshold value described above for at least 95% or more of the test tiles.

(4) In addition to received signal strength measurements, actual data calls shall be used to test the data transmission system. Both inbound and outbound paths shall be simultaneously tested, and a deficiency in either one will yield a failed data call. Test messages shall consist of a continuous sequential unidirectional uplink and downlink test transmissions to and from the data radio in the test vehicle, with a message size representative of the message size to be used during normal system operation, repeated a maximum of 2 times. An individual test message shall be considered successful if received within 2 retries. The test system shall be configured so that it launches an equal number of inbound and outbound test messages. For each tile tested, the pass/fail criterion shall be determined by dividing the number of successful messages received within the tile by the number of test messages sent within the tile. The data test in the bounded service area is deemed to PASS if the percentage of tiles that meets this pass criterion equals or exceeds 95%.

(5) For any tile that fails to meet the required threshold for tile coverage reliability, the system Contractor will be permitted to explore the possible causes to establish if the test failure was due to equipment malfunction, unanticipated reconfiguration of site equipment, interference from other systems, or other causes. The tile shall be retested following this investigation and any appropriate remediation. Retest results shall be included in the overall area coverage reliability score.

(6) Specific coverage areas shall be tested by dividing the specific coverage area into at least 10 test tiles that are evenly distributed along immediately surrounding roadways and throughout parking areas at each designated location. . For each tile tested, the pass/fail criterion shall be determined by dividing the number of successful messages received within the tile by the number of test messages sent within the tile. The data test in the bounded service area is deemed to PASS if the percentage of tiles which meets this pass criterion equals or exceeds 90%.

(7) Measurements shall be made of the talk-out signals from each of the base station sites established for Community Transit coverage to the field test locations. During the testing, the RF signal level measurements taken at each test location and from each base station site shall be clearly documented, along with all other pertinent test data, in accordance with the approved test plan and procedures.

(8) The signal level measurement tests shall be performed in a vehicle moving at not less than 20 mph, wherever practical, with an antenna approximately two meters above ground level.

(9) From the radios supplied by the Contractor under this Contract, Community Transit shall randomly select units to be used for the coverage tests. Not less than three different mobile radios shall be used during these tests. The

antenna used for testing shall be the same model as will be installed on revenue vehicles.

2.12.02.05 TESTING STAGE 5: SYSTEM ACCEPTANCE TESTING (SAT)

A. The SAT is the final test to be completed and can only be initiated once all of the system elements have been installed and configured and all other tests have been successfully completed. The SAT looks at the entire system, and tests are completed to ensure that the overall functional requirements are met.

B. Each requirement listed in the specification shall be tested or, in case it may not be feasible to test certain functions in the operational environment, evidence for correct function is to be provided.

C. Acceptance testing shall be performed on all equipment and services placed into service to demonstrate the performance of the system as a whole.

D. The Contractor shall develop a System Acceptance Testing plan, which shall be submitted to Community Transit for review and acceptance at least sixty (60) days prior to commencement of System Acceptance Testing. The acceptance plan shall include any tests necessary to document that the system is performing in compliance with the Contract requirements.

E. System Acceptance Testing shall be conducted over a minimum four month period. During the system acceptance testing period, the Contractor shall measure and report system and subsystem performance, defects and failures, and report same on a weekly basis.

F. System Acceptance will be granted when:

(1) All System Acceptance Testing requirements have been met.

(2) All data radio coverage testing has been completed and accepted.

(3) All training has been completed and accepted.

(4) All as-built and final documentation has been delivered and accepted

2.13 TRAINING

2.13.01 General

A. The Contractor shall be responsible to train Community Transit-designated personnel according to the requirements specified herein.

B. The Contractor shall be responsible for the supply of all training materials including, at a minimum:

(1) Training setups of equipment, including mounting and all power supplies and simulators required to simulate normal operation.

(2) Instructor guides.

(3) Student guides.

(4) Operations manuals.

(5) Training presentations.

(6) Training handouts.

(7) Quick reference guides.

(8) Interactive videos or demonstrations.

(9) Course and instructor comments sheets

C. A Training Program shall be developed and submitted a minimum forty-five (45) days before delivery of training materials that describes:

(1) Each course to be conducted.

(2) An overview of delivery methods for each course, including hands-on and group work experience.

(3) The course objectives for trainees.

(4) An evaluation plan, including criteria for success of the course, based upon the goals and objectives, and evaluation steps and instruments to be employed.

(5) A proposed schedule for each class, keyed to the installation process and constrained by availability of trainees away from regular duties.

(6) A plan for developing or customizing course material.

(7) Resumes of personnel proposed to be trainers for each class, demonstrating that they are experienced, effective training professionals.

D. Training shall include course development, providing instructors, and supplying all handouts, materials, classroom aids, etc. required to conduct the training.

E. Training shall take place at Community Transit-designated facilities in Snohomish County.

F. Practical training on equipment shall occupy a significant portion of all training classes.

G. The training presentations and material shall be in English.

H. Instruction shall cover equipment familiarization and systems operation. The minimum training is that which is necessary to bring those employees designated to the level of proficiency required for performing their respective duties.

I. The Contractor shall provide experienced and qualified instructors to conduct all training sessions. The Contractor is responsible for ensuring that the instructors teaching these courses are not only familiar with technical information but are able to utilize proper methods of instruction, training aids, audiovisuals and other materials to provide for effective training.

J. The Contractor is responsible for providing all training aids, audiovisual equipment and visual aids for the conduct of these courses.

K. At least one session of each different training course shall be videotaped by the Contractor onto DVD.

L. All training materials are to become the property of Community Transit at the conclusion of training.

M. Maintenance training shall commence during the time when equipment is installed on the coaches.

N. The Contractor shall submit the training curricula, for review and approval by Community Transit.

O. Training curricula, presentations, and materials shall be provided to Community Transit for review a minimum sixty (60) days prior to commencement of equipment installation. No training shall commence until these items have been approved by Community Transit.

2.13.02 Training Sessions

2.13.02.01 GENERAL REQUIREMENTS

A. The Contractor shall be responsible for training Community Transit trainers and senior staff in the operation and maintenance of the APTS.

B. The Contractor shall assume up to ten (10) persons per class.

C. In its Proposal, the Contractor shall identify the training hours required for each class. All classes shall be a minimum of four (4) hours.

D. The following training sessions shall be provided by the Contractor:

Class	Number of Classes	Subject
Onboard Operations	3	Train-the-trainer on the operation of onboard equipment
Transit Operations	3	Train dispatch staff (two fixed route and one paratransit training session) on system operation
Maintenance	2	Train maintenance personnel in the following: - First line maintenance (troubleshooting, diagnostics, configuration and remove and replace). - Second line maintenance (subassembly or board-level troubleshooting, diagnostics, configuration, and replacement).
System Administration	2	Train senior staff on the configuration and administration of the system
Radio System	2	Train senior staff and contracted maintenance staff on the configuration, operation and maintenance of the radio

		system
Reporting	3	Train senior staff on the reporting capabilities of the system and on the mechanics of creating reports and/or developing ad hoc reports
IT Training	2	Per the requirements in 2.13.02.02.
Follow-up	1	Follow-up training and consultation between 30 60 days after initial training to ensure best use of system by users

2.13.02.02 INFORMATION TECHNOLOGY TRAINING

A. Training shall be provided to fully familiarize IT personnel with all aspects of the system software including the structure of the applications, tables utilized, network connections and settings, plus other similar information.

B. The trainer for this course shall be technical in background as this training will be highly technical “back end” information and not end-user type training.

C. At the conclusion of training, the Community Transit personnel involved, including database administrators and system analysts shall have a thorough understanding of the following as applicable:

(1) Applications’ architectures

(2) Data flows

(3) Interfaces

(4) Development tools used

(5) Development assumptions

(6) Directory structures

(7) Processing scripts

(8) Data dictionaries

(9) System flows

(10) Table relationships

(11) Table growth

(12) Data conversion methods

(13) Recommended backup strategies

(14) Application programs

D. Data diagrams shall be developed using the latest version of Microsoft Visio.

E. All programs shall be defined and described fully, showing all inputs/outputs, samples of reports, logic flows and major functions described.

2.14 WARRANTY AND MAINTENANCE

2.14.01 Warranty Requirements

2.14.01.01 GENERAL REQUIREMENTS

A. The Contractor shall provide a statement of warranty with its Proposal that describes the system warranty coverage, in accordance with the requirements defined herein.

B. Contractor warrants that is has good title to the system and the right to sell to Community Transit free of any proprietary rights of any manufacturer (if the Contractor is not the manufacturer) or other party, and free of any lien or encumbrance.

C. Contractor warrants that it has good title to all system software or that it has the right to license the use of such software, or both, free of any proprietary rights of any other party and free of any other lien or encumbrance.

D. Contractor warrants that all equipment furnished is guaranteed to be free from fleet and related defects for the warranty period. A fleet defect is defined as the failure of identical items covered by the warranty period in proportion to the equipment for each contractual requirement. The portion shall be 10%.

E. Contractor shall also warrant that all installation work and system hardware shall perform according to the specifications for the warranty period.

F. All warranties and guarantees of Subcontractors, suppliers and manufacturers with respect to any such work and system hardware shall be obtained by the Contractor for the benefit of Community Transit regardless of whether or not such warranties and guarantees have been assigned or transferred to Community Transit by separate agreement. The Contractor shall fully enforce such warranties and guarantees on behalf of Community Transit.

2.14.01.02 WARRANTY PERIOD

A. Contractor agrees that the system and all related installation work shall be subject to the warranties and obligations set forth in this section.

B. Warranty shall commence upon system acceptance per the provisions of 2.12.02.05F, and end after a one-year period.

2.14.01.03 HARDWARE WARRANTY

A. During the Warranty Period, the Contractor using stock from the spare parts inventory will replace defective hardware.

B. For each defective part, the Contractor shall provide repaired or new replacement units to replenish the spare parts inventory. The replacement units shall be fully tested and certified compliant with the original part.

C. The cost of all transportation and insurance charges for shipping defective and replacement parts to and from the Contractor shall be borne by the Contractor.

D. Replacement parts shall be provided within fourteen (14) days of the defective part being received by the Contractor.

2.14.01.04 SOFTWARE WARRANTY

A. The Contractor warrants that all software is free of defects in design and workmanship, and will perform according to the specifications.

B. The Contractor warrants that all software does not contain any timers, counters, or pre-programmed devices that will cause the software to be erased, inoperable, or incapable of performing as specified.

C. The Contractor warrants that all software contains an appropriate security and control system for protecting the software and the data from unauthorized use.

D. The Contractor warrants that all software shall be free of “back doors” and all other known methods of software access that bypass the normal system security features.

E. The Contractor shall develop, test, provide and install all applicable software “patches” or upgrades that become necessary to remedy system software faults or “bugs” identified during the warranty period.

F. Through the Warranty Period, the Contractor shall provide at no additional cost, all version updates, software patches and error corrections available for the system software provided.

2.14.02 System Maintenance

2.14.02.01 GENERAL RESPONSIBILITIES

A. The Contractor shall be responsible for providing all maintenance during the warranty period, and shall be responsible for all shipping costs for returned and replaced equipment. Community Transit staff will be responsible for removing and replacing defective equipment.

B. Post-warranty, Community Transit vehicle maintenance staff will be responsible for fixed route onboard equipment diagnostics, troubleshooting and maintenance to the major subassembly level. Adequate training shall be provided for Community Transit vehicle maintenance staff to perform these responsibilities.

C. The Contractor shall provide a Maintenance & Operations Support Plan with its Proposal that describes routine maintenance measures, response for repairs, communications service, and operations support during the warranty period.

D. During the warranty period, the Contractor shall respond within 8 hours to any central system faults and within 24 hours to any onboard system faults. The Contractor shall provide a reliable method for telephone problem notification. Maintenance issues shall be resolved in a timely manner, as agreed to in the Maintenance & Operations Support Plan.

2.14.02.02 SPARE PARTS

A. The Contractor shall propose for consideration of Community Transit a list of spare parts (Spare Parts List) to be provided. This list shall include replacement parts,

components or sub-assemblies for all items of equipment provided, in sufficient quantities to meet the estimated need for warranty and maintenance purposes for a period of two years. A spare ratio of 10% or greater is preferred.

B. The Spare Parts List shall contain all specialized tools and equipment necessary to install, calibrate, test and maintain the system. All wiring, cabling and adapters shall also be provided.

C. The Spare Parts shall be placed into the spare parts inventory and become the property of Community Transit upon acceptance.

2.14.02.03 TEST BENCH

A. The Contractor shall supply a fully-configured onboard equipment test bench that includes at a minimum the following:

(1) A work bench with sufficient space, power distribution, etc. to troubleshoot and dismantle malfunctioning equipment removed from a coach.

(2) A minimum one (1) unit of all onboard equipment, including both fixed route and paratransit equipment.

(3) A wireless LAN access point to be used for testing purposes.

(4) A complete set of tools, test equipment, computer software, computer hardware and simulators as needed to conduct troubleshooting, diagnostics and configuration of equipment.

B. The Contractor shall include a description of the proposed test bench in its Proposal, and shall submit detailed test bench configuration and equipment information at the time of the Preliminary Design Review submission for review and approval by Community Transit. The Contractor is advised that the standard “bus-in-a-box” collection of the onboard equipment is not sufficient; a full-capability test bench is required.

2.15 GLOSSARY

AC	Alternating Current
ADA	Americans with Disabilities Act
AGL	Above ground level
AMSL	Above mean sea level
APC	Automatic Passenger Counter
APTS	Advanced Public Transportation System
ASA	Automatic Stop Annunciation
ASCII	American Standard Code for Information Interchange
ATP	Used as "HASTUS-ATP runtime analysis module"
AutoCAD	Computer Aided Design software from Autodesk
AVL	Automatic Vehicle Location
BNC	Bayonet Neill-Concelman: connector for coaxial cable
Bps	Bits per second
BRT	Bus Rapid Transit
C	Celsius
CAD	Computer Aided Dispatch
CCTV	Closed circuit television
CDMA	Code Division Multiple Access
CD-ROM	Compact Disc read-only memory

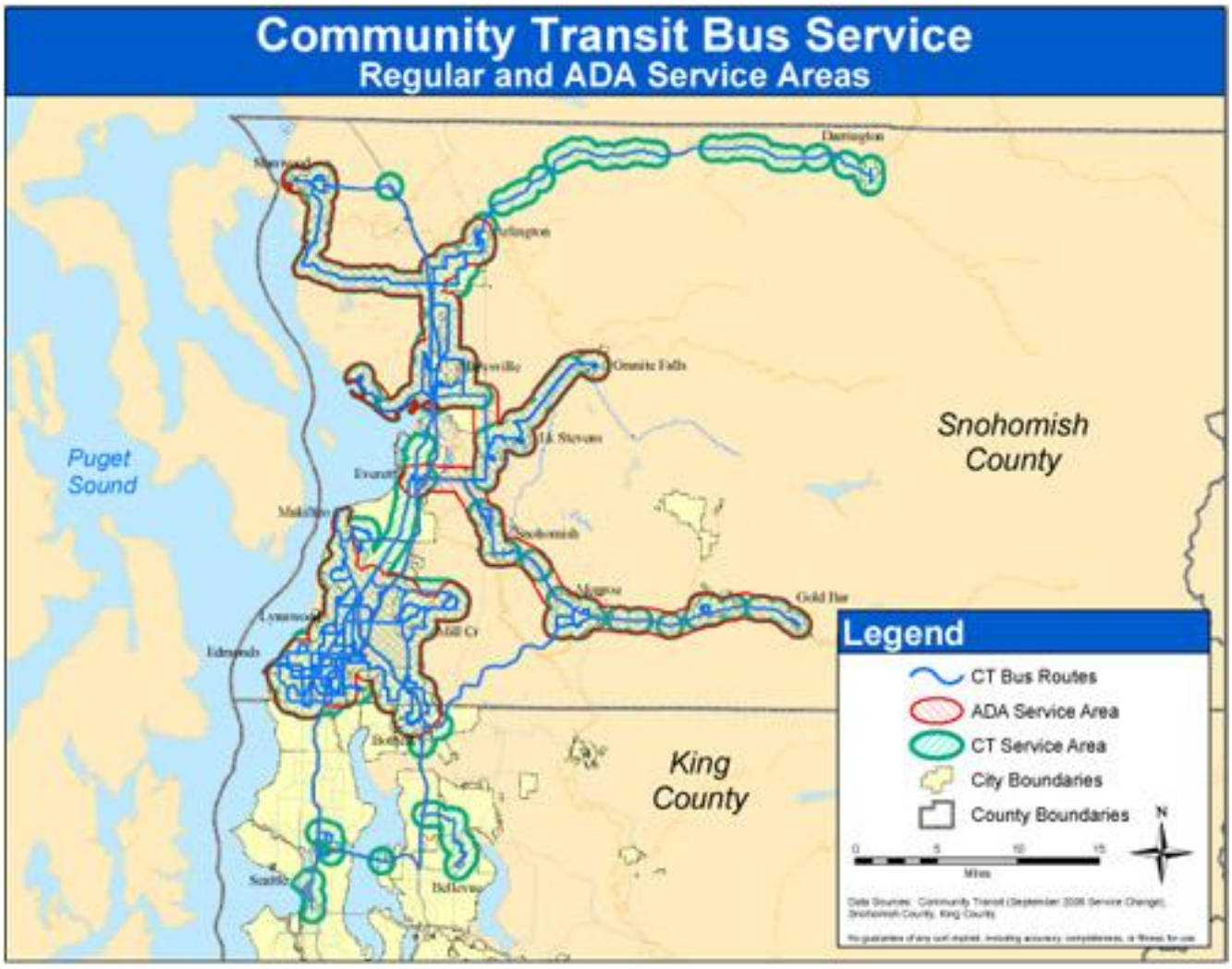
CFR	Code of Federal Regulations
CPC	Coverage Performance Criteria
CTCSS	Continuous Tone-Controlled Squelch System
DART	Dial-a-Ride-Transportation
dB	Decibel
dBc	Decibels relative to carrier
DBF	dBase file extension
DDU	Driver Display Unit
DIN	Deutsches Institut für Normung: German institute for standardization
DRS	Database Reporting System
DVD	Digital Versatile Disk (formerly Digital Video Disk)
EA	Emergency Alarm
EIA	Electronic Industries Alliance
EMI	Electromagnetic Interference
ERP	Effective Radiated Power
ESRI	Environmental Systems Research Institute
F	Fahrenheit
FAT	Factory Acceptance Testing
FCC	Federal Communications Commission
FDR	Final Design Review
FIPS	Federal Information Processing Standards
GIS	Global Information System
GPRS	Generalized Packet Radio Service
GPS	Global Positioning System
GSM	Global Systems for Mobile Communications systems
GUI	Graphical User Interface
HP	Hewlett Packard
HVAC	Heating, Ventilation, and Air Conditioning
Hz	Hertz
IBM	International Business Machines
ID	Identification
IEEE	Institute of Electrical and Electronics Engineers
IP	Ingress Protection (i.e. IP 66)
IP	Internet Protocol (i.e. IP addressing)
IT	Information Technology
ITS	Intelligent Transportation System
IVR	Interactive Voice Response
kg	kilograms
LAN	Local Area Network
lbs	pounds
LCD	Liquid crystal display
MDT	Mobile Data Terminal
MIL-STD	Military Standard
mph	Miles per hour
MS	Microsoft
MSD	Material Selection Documentation
MTBF	Mean time between failures
N	Newton
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NTD	National Transit Database
O&M	Operation and Maintenance
ODBC	Open Database Connectivity
OEM	Original Equipment Manufacturer
OIT	Onsite Integration Testing
OS	Operating System

OSHA	Occupational Safety and Health Administration
PA	Public address
PASS	Trapeze Paratransit Software
PC	Personal Computer
PCMCIA	Personal Computer Memory Card International Association
PDA	Personal Digital Assistant
PDR	Preliminary Design Review
PMDT	Paratransit Mobile Data Terminal
ppm	Parts per million
RAID	Redundant Array of Independent Disks
RDT	Remote Dispatch Terminal
RF	Radio Frequency
RFI	Radio Frequency Interference
RMS	Root mean square
RSI	Repetitive Stress Injury
RX	Receive
SAE	Society of Automotive Engineers
SAT	System Acceptance Test
SAT	Standard Acceptance Test
SBS	Smart Bus Stops
SDD	System Design Document
SINAD	Signal including noise and distortion
SIT	System Integration Test
SQL	Structured Query Language
TCIP	Transit Communications Interface Protocol
TIA	Telecommunications Industry Association
TSB	Telecommunications Systems Bulletin
TSP	Transit Signal Priority
TX	Transmit
UL	Underwriters Laboratories Incorporated
URL	Uniform Resource Locator
USB	Universal Serial Bus
V	Volts
VDC	Volts of continuous current (direct current (DC))
VGA	Video graphics array
VLU	Vehicle Logic Unit
VMS	Variable Message Sign
VPN	Virtual Private Network
VSWR	Voltage Standing Wave Ratio
WAAS	Wide Area Augmentation System
WAN	Wide Area Network
WDOLS	Wireless Data On-Off Load System
WLAN	Wireless local area network
XHTML	eXtensible HyperText Markup Language
XML	eXtensible Markup Language

Attachment 1

Community Transit Service Area Map

REQUEST FOR PROPOSALS - RFP #50-07
ADVANCED PUBLIC TRANSPORTATION SYSTEM (APTS) PROCUREMENT
ATTACHMENTS



Attachment 2

McCain Interface Unit Technical Information

Specification

McCain Interface for the Community Transit Smart Card

October 13, 2005

By

Steven J. Rice

Document Number M40892-D1

Revision 2

Revision History

Revision 1: Added handshake and verification to the Luminator Download functions.

Revision 2: Changed Luminator Download format for transfer verification.

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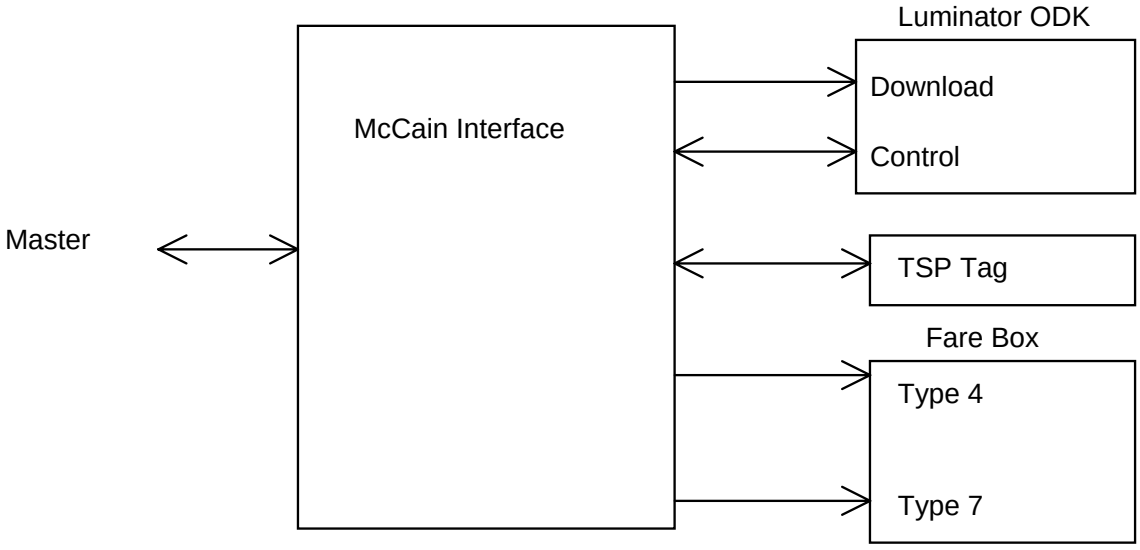
{tc \l2 "McCain Interface for the Community Transit Smart Card}

Scope
{tc \l3 "Scope}
The McCain Interface allows a single control port to be used to interface from a control port to five peripheral ports:

1. TSP tag
2. Luminator control
3. Luminator download
4. Type 4 fare box
5. Type 7 fare box



This document describes the interface requirements for the control port.

Upon being powered, the McCain Interface shall probe each peripheral port to determine if there is a connection to each port. Also, when a communication is initiated for a port, its connection status is ascertained.

The McCain Interface shall perform communications with each peripheral, utilizing appropriate signals and maintaining timing of such signals.

The communications to a master through the control port shall be as a slave. The master may send commands or queries as described herein without consideration for peripheral timing.

Interface Specification
{tc \l2 "Interface Specification}

Hardware
{tc \l4 "Hardware}
Connector: DB9S

Signals: RS485, 38400 baud.

RS485+, RS485-, Signal Return, Ground

Recommended cabling: shielded, twisted pair, 22 gauge minimum.

Format

{tc \l4 "Format}

The McCain Interface can be a member of several multi-drop connections to an RS485 bus. The McCain interface is a slave, meaning that it writes to the bus only when queried from a master. The master issues commands and queries in the form of a packet. There are two kinds of packets, command and query packets.

Packet Sequencing

{*tc \l5 "Packet Sequencing****}***

The following is the sequence for a command packet from the master:

1. Command packet issued from the master.
2. Master switches its RS485 port to receive mode after the last byte is completely transmitted.
3. The slave to which the packet is addressed starts a receive clock of T_{Packet} when this slave recognizes that it is the destination. If the packet reception is not complete in T_{Packet}, a NAK is returned.
4. If the whole packet is correctly received, an ACK is returned.
5. The master to wait up to $T_{Ack/Nak}$ for an ACK. If the time expires without an ACK, the packet is assumed to not have been delivered. If a NAK is received, the packet is assumed to not have been delivered.
6. If a command packet is a query, the slave is to respond to the query with a response packet after the ACK packet. After the ACK packet, the master may wait up to $T_{Response}$, after which the packet is assumed to be lost. There is no confirmation of reception to the slave. If the response packet is not correctly received, it is the master=s responsibility to issue another query.

Packets may be sent from the master after any of the following events have occurred:

1. An ACK is received after sending a command packet.
2. A timeout of $T_{Ack/Nak}$ occurs after sending a command packet
3. A NAK is received after sending a command or query packet.
4. A timeout of $T_{Ack/Nak}$ occurs without receiving an ACK after sending a query packet.
5. A response packet is received after receiving an ACK packet after sending a query packet.
6. A timeout of $T_{Response}$ occurs without receiving a response packet after receiving an ACK packet after sending a query packet.

Note that the actions to be taken from a series of commands may be queued in the McCain Interface. If the queue approaches internal limits, ACK/NAK packets may be delayed, but will

be within 75% of the timeout time. An ACK packet will be issued if the command can be queued. A NAK packet will be issued if the command cannot be queued, in which case the command may be re-issued as many times as necessary. Also, if the master must wait for an action to be completed, the McCain Interface may be polled for status.

Packet Structure

{tc \l5 "Packet Structure}

Command and query packet structure

1. Sync
2. STX
3. Destination slave number
4. Byte Count
5. Checksum

6+. Data

Where:

Sync is 2 synchronization bytes each being hex FF, ignored by the receiver.
STX is the ASCII STX character. (hex 02)
Destination is the destination slave device number. For the McCain interface, the number is 1.
Byte count is the number of bytes in the data segment.
Checksum is the sum of the characters in the data segment, modulo 256.
Data contains any data for the packet, including command / query codes and ancillary data.

An ACK packet is as follows:

1. Sync
2. ACK
2. Source slave number

Where

Sync is 2 synchronization bytes each being hex FF, ignored by the receiver.
ACK is the ASCII ACK character. (hex 06)
Source is the source slave device number. For the McCain interface, the number is 1.

A NAK packet is as follows:

1. Sync
2. NAK
3. Source slave number

Where

Sync is 2 synchronization bytes each being hex FF, ignored by the receiver.
NAK is the ASCII NAK character. (hex 15)
Source is the source slave device number. For the McCain interface, the number is 1.

A response packet is as follows:

1. Sync
2. ENQ
3. Source slave number
4. Byte Count
5. Checksum
6+. Data

Where:

Sync is 2 synchronization bytes each being hex FF, ignored by the receiver.
ENQ is the ASCII ENQ character. (hex 05)
Source is the source slave device number. For the McCain interface, the number is 1.
Byte count is the number of bytes in the data segment.
Checksum is the sum of the characters in the data segment, modulo 256.
Data contains the response data for the packet.

Data
{tc \l4 "Data}

The data segment of the command / query packet causes the McCain interface to take an action. The format of the data packet is as follows:

1. Command code
2. Optional additional data

The command codes, their associated additional data and the response data format are as follows:

1. Get fare box type
   No additional data.
   1 byte response (0 = none connected, 4 = type 4, 7 = type 7)
2. Get tag status
   No additional data
   1 byte response (0 = not connected, 1 = tag connected)
3. Get Luminator command status
   No additional data
   1 byte response (0 = not connected, 1 = connected)
4. Get vehicle ID number
   No additional data
   4 byte response, unsigned integer, vehicle ID, LSB first, 0 if no tag connected

5. Get field value
    Byte 1: field number (See tag field number section following)
    4 byte response, unsigned integer, field value, LSB first, 0 if no tag connected or if the field does not exist in the tag=s format.
6. Get Luminator command response (gets any response from the Luminator command channel that has been buffered by the interface board. Up to 255 bytes of data may be buffered. Note that the buffer is cleared when data is sent to the Luminator command channel. Buffered data is held and can be read repeatedly.
    No additional data
    Response consists of the currently buffered response data.
7. Get key press status
    No additional data
    1 byte response (0 = no pending key presses, 1 = pending key presses
8. Get Luminator command status
    No additional data
    1 byte response, bit coded (nothing set = command port idle, bit 0 = command port send active, bit 1 = response active, bit 2 = Response buffer not empty)
9. Get Luminator download status
    No additional data
    1 byte response (0 = DDU to Interface active or not started, 1 = Transfer to Luminator active, 2 = DDU to Interface Transfer Error, 3 = Interface to Luminator Transfer Error, 4 = Transfer to Luminator Complete)
10. Get Diagnostic Word
    No additional data
    4 byte response, LSB first, returns the value of the diagnostic word, used to examine the value of various locations for diagnostic use. This function has not guaranteed response.
11 - 16. Reserved for future use
17. Set tag field
    Byte 1: field number (See tag field number section following)
    Byte 2 - 5: Field set data (unsigned integer, LSB first)
18. Issue a fare box key press
    Byte 1: key to press (See key code list following)
19. Issue a Luminator command
    Byte 1+: command to be sent to the Luminator command port
20. Initiate Luminator download
    No additional data
21. Issue Luminator download data
    Byte 1 = sequence number (0 – 255, wraps around from 255 to 0)
    Byte 2+: data to be sent to the the Luminator download port
22. Terminate Luminator download
    Byte 1, 2: CRC of the downloaded data. (See Appendix 2)
    Byte 3,4,5,6: Total number of bytes in the downloaded data segment.

Tag Fields

{tc \l4 "Tag Fields}

Tag fields, when used, are coded by the following numbers

1. Operator ID
2. Class
3. Route
4. Run
5. Trip
6. Lateness — on-time status
7. Ridership — real-time passenger load
8. SignRoute — timetable route number
9. SignExpress — timetable express flag
10. Schedule — agency schedule ID
11. Override — self-exclusion from priority
12. SecurityAlert — panic button tripped
13. Latitude — encoded latitude coordinate angle*
14. Longitude — encoded longitude coordinate angle*
15. Speed
16. StopRequested
17. Movement — to indicate left / through, or to identify a specific phase
18. RequestService — request service strategy ID number
19. RequestLevel — self-assessment of level of need
20. Aux0 — Auxiliary supporting data which may be used by agency.
21. Aux1
22. Aux2
23. Aux3
24. Aux4
25. Aux5
26. Aux6
27. Aux7
28. Aux8
29. Aux9

For internal use, we include the following fields

30. System
31. Agency
32. Vehicle ID
33. Format number

Key Press Codes

{tc \l4 "Key Press Codes}

Following are the potential key press codes. Note that four of the keys are not available on a type 4 fare box. If a type 4 fare box is connected, these key press codes will be ignored.

0. 0 key
1. 1 key

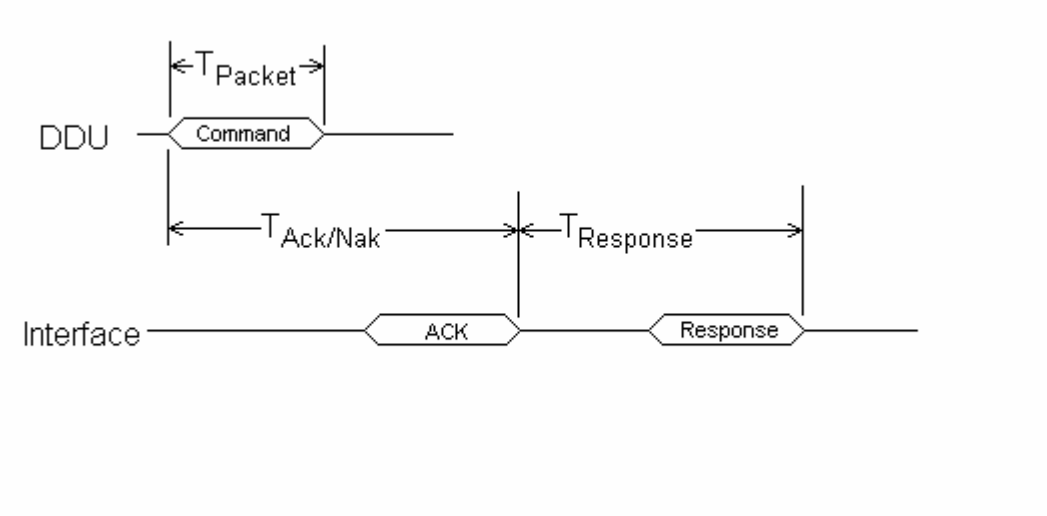
2. 2 key
3. 3 key
4. 4 key
5. 5 key
6. 6 key
7. 7 key
8. 8 key
9. 9 key
10. * key
11. # key
12. A key
13. B key
14. C key
15. D key
16. dump key

Timing

There are three maximum times in the conversation. They are:

Parameter	Maximum Time in MSec
T_{Packet}	200
$T_{Ack/Nak}$	2000
$T_{Response}$	1000

They are illustrated in the following:



T_{Packet} is used by the Interface to reset when a partial Command is received.
$T_{Ack/Nak}$ is used by the DDU to identify when to re-transmit and is used by the Interface to pace the commands.

$T_{Response}$ is used by the DDU to identify when to re-transmit a query.

Appendix A: Examples

Typical Startup

Connectivity of the system may be checked by issuing a “Get fare box type” command. The communication between the DDU and the Interface would be as follows:
From DDU: Get fare box request
FF, FF, 02, 01, 01, 01, 01
The DDU switches to receive, the Interface switches to transmit. From the Interface: Ack
FF, FF, 06, 01
Then the Interface issues the response, data being set to 7 for type 7.
FF, FF, 05, 01, 01, 07, 07
The Interface switches to receive and the communication is complete.

At this point, the DDU knows that the Interface is active and that it is connected to a type 7 fare box. This would normally be followed by a “Get tag status” command to verify that a tag is connected and a “Get Luminator command status” to verify that a luminator controller is connected and operating.

Getting the Vehicle ID

The bus ID number is stored in the tag. The Interface gets this number from the tag at startup. To acquire this number, a “Get vehicle ID number” command is issued.
From the DDU: Get vehicle ID number
FF, FF, 02, 01, 01, 04, 04
The DDU switches to receive, the Interface switches to transmit. From the Interface: Ack
FF, FF, 06, 01
The Interface issues the response, data being set to Bus 5061 (hex 13C5) in 4 bytes
FF, FF, 05, 01, 04, D8, C5, 13, 00, 00
The Interface switches to receive and the communication is complete.

A Farebox Keypress Sequence

In this example, the sequence of key strokes are “dump”, “5”, “7”, “#”. Timing is handled by the interface. The DDU may send the commands as fast as communications allows.
From the DDU: Issue Farebox key press of “dump”
FF, FF, 02, 01, 02, 22, 12, 10
The DDU switches to receive, the Interface switches to transmit. From the Interface: Ack
FF, FF, 06, 01
The Interface switches to receive, the DDU switches to transmit. From the DDU: Issue Farebox key press of “5”
FF, FF, 02, 01, 02, 17, 12, 05
The DDU switches to receive, the Interface switches to transmit. From the Interface: Ack
FF, FF, 06, 01

The Interface switches to receive, the DDU switches to transmit. From the DDU: Issue Farebox key press of “7”

FF, FF, 02, 01, 02, 19, 12, 07

The DDU switches to receive, the Interface switches to transmit. From the Interface: Ack

FF, FF, 06, 01

The Interface switches to receive, the DDU switches to transmit. From the DDU: Issue Farebox key press of “#”

FF, FF, 02, 01, 02, 1D, 12, 0B

The DDU switches to receive, the Interface switches to transmit. From the Interface: Ack

FF, FF, 06, 01

The Interface switches to receive. If there is a necessity to monitor the Interface and wait for the keypad sequence to complete at the Farebox, the following is an example of requesting the status while the key presses are still in progress:

The DDU switches to transmit. From the DDU: Get key press status

FF, FF, 02, 01, 01, 07, 07

The DDU switches to receive, the Interface switches to transmit. From the Interface: Ack

FF, FF, 06, 01

The Interface issues the response, data being set to Pending (1)

FF, FF, 05, 01, 01, 01, 01

The Interface switches to receive and the communication is complete.

The following is an example of requesting the status after the key presses are complete.

The DDU switches to transmit. From the DDU: Get key press status

FF, FF, 02, 01, 01, 07, 07

The DDU switches to receive, the Interface switches to transmit. From the Interface: Ack

FF, FF, 06, 01

The Interface issues the response, data being set to Done (0)

FF, FF, 05, 01, 01, 00, 00

The Interface switches to receive and the communication is complete.

Setting the Route in the Tag

In the following example, the Route field of the Tag is set to 10216 and read back to verify that it was set correctly.

From the DDU: Issue Set Tag Field, Route (3) to 10216 (hex 27E8)

FF, FF, 02, 01, 06, 23, 11, 03, E8, 27, 00, 00

The DDU switches to receive, the Interface switches to transmit. From the Interface: Ack

FF, FF, 06, 01

The Interface switches to receive, the DDU switches to transmit. From the DDU: Issue Get field value for Route (3)

FF, FF, 02, 01, 02, 08, 05, 03

The DDU switches to receive, the Interface switches to transmit. From the Interface: Ack

FF, FF, 06, 01

The Interface continues with the response of 10216 (hex 27E8) after reading the Tag

FF, FF, 05, 01, 04, 0F, E8, 27, 00, 00
The Interface switches to receive and the communication is complete.

Transmission Error Sequences

If the Interface is not powered, nothing is returned.

If there is a fault causing a data error in the Sync, STX, Slave number or an error causing an increase in the Byte Count, nothing is returned.

If there is an error causing a decrease in the Byte Count, an error in the Checksum or the Data, a NAK will be returned. For example, in the issue of a “dump” key press:
From the DDU: Issue Farebox key press of “dump”
FF, FF, 02, 01, 02, 22, 12 (received as 02), 10
The DDU switches to receive, the Interface switches to transmit. From the Interface: Nak
FF, FF, 06, 15
The DDU may send the command again. Note that this is the same response for a full queue in the Interface.

Appendix B: CRC Code

The CRC code is defined as the result of the calculation of the following code segment:

```
static const unsigned int uipCrcTable[256] =
    {
    0x0000, 0x1189, 0x2312, 0x329b, 0x4624, 0x57ad, 0x6536, 0x74bf,
    0x8c48, 0x9dc1, 0xaf5a, 0xbed3, 0xca6c, 0xdbe5, 0xe97e, 0xf8f7,
    0x1081, 0x0108, 0x3393, 0x221a, 0x56a5, 0x472c, 0x75b7, 0x643e,
    0x9cc9, 0x8d40, 0xbfdb, 0xae52, 0xdaed, 0xcb64, 0xf9ff, 0xe876,
    0x2102, 0x308b, 0x0210, 0x1399, 0x6726, 0x76af, 0x4434, 0x55bd,
    0xad4a, 0xbcc3, 0x8e58, 0x9fd1, 0xeb6e, 0xfae7, 0xc87c, 0xd9f5,
    0x3183, 0x200a, 0x1291, 0x0318, 0x77a7, 0x662e, 0x54b5, 0x453c,
    0xbdcb, 0xac42, 0x9ed9, 0x8f50, 0xfbef, 0xea66, 0xd8fd, 0xc974,
    0x4204, 0x538d, 0x6116, 0x709f, 0x0420, 0x15a9, 0x2732, 0x36bb,
    0xce4c, 0xdfc5, 0xed5e, 0xfcd7, 0x8868, 0x99e1, 0xab7a, 0xbaf3,
    0x5285, 0x430c, 0x7197, 0x601e, 0x14a1, 0x0528, 0x37b3, 0x263a,
    0xdecd, 0xcf44, 0xfddf, 0xec56, 0x98e9, 0x8960, 0xbbfb, 0xaa72,
    0x6306, 0x728f, 0x4014, 0x519d, 0x2522, 0x34ab, 0x0630, 0x17b9,
    0xef4e, 0xfec7, 0xcc5c, 0xddd5, 0xa96a, 0xb8e3, 0x8a78, 0x9bf1,
    0x7387, 0x620e, 0x5095, 0x411c, 0x35a3, 0x242a, 0x16b1, 0x0738,
    0xffcf, 0xee46, 0xdcdd, 0xcd54, 0xb9eb, 0xa862, 0x9af9, 0x8b70,
    0x8408, 0x9581, 0xa71a, 0xb693, 0xc22c, 0xd3a5, 0xe13e, 0xf0b7,
    0x0840, 0x19c9, 0x2b52, 0x3adb, 0x4e64, 0x5fed, 0x6d76, 0x7cff,
    0x9489, 0x8500, 0xb79b, 0xa612, 0xd2ad, 0xc324, 0xf1bf, 0xe036,
    0x18c1, 0x0948, 0x3bd3, 0x2a5a, 0x5ee5, 0x4f6c, 0x7df7, 0x6c7e,
    0xa50a, 0xb483, 0x8618, 0x9791, 0xe32e, 0xf2a7, 0xc03c, 0xd1b5,
    0x2942, 0x38cb, 0x0a50, 0x1bd9, 0x6f66, 0x7eef, 0x4c74, 0x5dfd,
    0xb58b, 0xa402, 0x9699, 0x8710, 0xf3af, 0xe226, 0xd0bd, 0xc134,
    0x39c3, 0x284a, 0x1ad1, 0x0b58, 0x7fe7, 0x6e6e, 0x5cf5, 0x4d7c,
    0xc60c, 0xd785, 0xe51e, 0xf497, 0x8028, 0x91a1, 0xa33a, 0xb2b3,
    0x4a44, 0x5bcd, 0x6956, 0x78df, 0x0c60, 0x1de9, 0x2f72, 0x3efb,
    0xd68d, 0xc704, 0xf59f, 0xe416, 0x90a9, 0x8120, 0xb3bb, 0xa232,
    0x5ac5, 0x4b4c, 0x79d7, 0x685e, 0x1ce1, 0x0d68, 0x3ff3, 0x2e7a,
    0xe70e, 0xf687, 0xc41c, 0xd595, 0xa12a, 0xb0a3, 0x8238, 0x93b1,
    0x6b46, 0x7acf, 0x4854, 0x59dd, 0x2d62, 0x3ceb, 0x0e70, 0x1ff9,
    0xf78f, 0xe606, 0xd49d, 0xc514, 0xb1ab, 0xa022, 0x92b9, 0x8330,
    0x7bc7, 0x6a4e, 0x58d5, 0x495c, 0x3de3, 0x2c6a, 0x1ef1, 0x0f78
    };
uiCrcValue = 0xFFFF;
for (iIndex = 0; iIndex < iDataLength; iIndex++) {
  uiCrcValue = (uiCrcValue >> 8) ^ uipCrcTable[(uiCrcValue ^ ucpData[iIndex]) & 0xff];
}
```

Attachment 3

Hastus ATP-Rider Interface Information

ATP-Rider measurement input interface

Overview

This external file contains information measured for specific stops of specific trips.

File creation

You can create this measurement external file format from **Manage Vehicle Schedules** using **Generate Measurement Interfaces** via the **Ridership** menu.

It contains one line for each stop of each trip to process in the current vehicle schedule. After the external file is created, only planned fields are initialized (fields *a* to *j, p and r*). Records are sorted by trip identifier and stop rank.

File importation into *HASTUS* table

Once measurement fields are completed (fields *k* to *o*, and *q*), this external file can be imported into *HASTUS* table measure. Use **Import Measurements** window available in the **Manage Vehicle Schedule** window. To be imported, records must have all their required fields and at least one of fields *l*, *m*, *n*, or *o* initialized.

Description of the interface format

What follows is a description of the file format and a list of the required fields.

Note that fields do not have fixed positions, they are separated by semicolons (;).

Time can be expressed in hours, minutes and seconds. Seconds are optional.

Date fields use your *HASTUS* settings of date format.

Example:

99VTAB;Lördag;2607;66;1;1;1;10957;Pokalvägen;240000;20000205;240000;240000;5;0;;AVL;;
99VTAB;Lördag;2607;66;1;1;4;10963;Verkstadsgatan;240200;20000205;240227;240252;2;0;x;;L8;

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Description	Type	Length	Format	Mandatory
a. Booking id *Identifies a booking. Bookings describe circumstances when different service levels are required.*	char	6		
b. Schedule type id *Identifies the day or days covered by the schedule.*	char	10		
c. Trip *Identifies the trip that was measured.*	char	16		X
d. Route *Identifies the route of the trip that was measured.*	char	5		X
e. Direction *Identifies the direction of the trip that was measured, as it appears in HASTUS (e.g. "Clockwise", "North").*	char	20		
f. Block *Identifies the block of the trip that was measured.*	char	8		
g. Stop rank *Identifies the rank of the stop where the measurement was recorded. Stop rank must be greater than or equal to 0, and rank 0 must correspond to the first stop of the trip.*	integer	3		X
h. Stop id *Identifies the stop where the measurement was recorded. Mandatory for a measurement used in Rider or when Location is not specified.*	char	9		X
i. Stop description *Identifies the description of the stop.*	char	100		
j. Scheduled time *Identifies the scheduled arrival time at the stop.*	integer	6	hhmmss	
k. Measure date *Identifies the date the measurement was recorded.*	char	8	Uses *HASTUS* settings	X

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Description	Type	Length	Format	Mandatory
l. Measured arrival time *Identifies the arrival time measured at the stop.*	integer	6	hhmmss	
m. Measured departure time *Identifies the departure time measured at the stop.*	integer	6	hhmmss	
n. Number of embarking passengers *Count of passengers boarding at the stop where the measurement was recorded.*	integer	3		
o. Number of debarking passengers *Count of passengers getting off at the stop where the measurement was recorded.*	integer	3		
p. Mandatory measurement *Indicates if the measurement must be recorded.*	boolean	1	'x'	
q. Source *Identifies the source of the measurement (ex. : Laboratory bus, AVL, farebox, etc.).*	char	20		
r. Location *Identifies location associated to measurement stop. Mandatory for a measurement used in ATP or when Stop id is not specified.*	char	10		X

Attachment 4

Fixed Site Radio Antenna, Transmission Line and Power Systems

Under separate contract, Community Transit will be installing 700 MHz antenna, transmission line, power and related infrastructure to be provided to the APTS Contractor as owner-furnished infrastructure. The Contractor shall be responsible for preparing a data radio system design that utilizes and is compatible with the supplied infrastructure, and that meets the requirements of this specification.

The following specifications for this infrastructure have been provided for Contractor reference. All of the following work is being performed by others.

Base Station Antenna Systems

The 700 MHz antenna systems at each of Community Transit's six repeater site are being installed under a separate contract. At two of the sites (Frailey Mountain and Tiger Mountain), separate 700 MHz transmit (TX) antenna systems will be installed and the existing 800 MHz transmit antenna systems will be unchanged. At these two sites, the receive (RX) antenna systems will be replaced with dual band 700/800 MHz antenna systems. At the other four sites (Gunsite Ridge, Clinton, Gunnysack Hill, and Queen Anne), dual band 700/800 MHz antenna systems will be installed for both the transmit and receive sides of the system. At all six sites, transmitter combiners and receiver multicouplers capable of operation on Community Transit's 700 MHz channels will be provided and installed under a separate contract. A table showing the transmit and receive antenna systems to be installed at each site is shown below.

Repeater Site	TX Antenna	RX Antenna	TX Combiner	RX Multicoupler
Frailey Mountain	Sinclair SE419-SF3P2LDF 764-869 MHz enclosed 9 dipole panel antenna.	TXRX CC806-R6-T5 Omnidirectional Antenna (5º Electrical Downtilt)	2-Channel 700 MHz Transmitter Combiner	Celwave Model TTAS80-0281-24 Tower-Top Preamplifier (804-822 MHz)
Gunsite Ridge	Sinclair SE419-SF3P2LDF enclosed 9 dipole panel antenna. 746-869 MHz	TXRX CC806-R6-T5 Omnidirectional Antenna (5º Electrical Downtilt)	Telewave Model XXXX 6-Channel 700/800 MHz Transmitter Combiner [NIC - Provided under a separate contract]	Celwave Model TTAS80-0281-24 Tower-Top Preamplifier (804-822 MHz)
Gunnysack Hill	Sinclair SE414-SF3PALDF adjustable beamwidth enclosed 4 dipole panel antenna. 746-869 MHz – Used as TX and RX Antenna. Horizontal Beamwidth set for 160º	TXRX CC806-R6-T5 Omnidirectional Antenna (5º Electrical Downtilt)	Telewave Model XXXX 6-Channel 700/800 MHz Transmitter Combiner [NIC - Provided under a separate contract]	Celwave Model TTAS80-0281-24 Tower-Top Preamplifier (804-822 MHz)
Clinton	Sinclair SE414-SF3PALDF adjustable beamwidth enclosed 4 dipole panel antenna. 746-869 MHz	Sinclair SE414-SF3P2LDF adjustable beamwidth enclosed 4 dipole panel antenna. 746-869 MHz	Telewave Model XXXX 6-Channel 700/800 MHz Transmitter Combiner [NIC - Provided under a separate contract]	Celwave Model RMC80-184-24 Receiver Multicoupler (804-822 MHz Preselector Filter)

	Horizontal Beamwidth set for 160º	Horizontal Beamwidth set for 160º		
Tiger Mountain	Andrew DB878H120E-A 14.0 dBd gain panel antenna - 746-806 MHz	TXRX CC806-R6-T5 Omnidirectional Antenna (5º Electrical Downtilt)	2-Channel 700 MHz Transmitter Combiner	Celwave Model TTAS80-0281-24 Tower-Top Preamplifier (804-822 MHz)
Queen Anne	Sinclair SE414-SF3PALDF adjustable beamwidth enclosed 4 dipole panel antenna. 746-869 MHz – Used as TX and RX Antenna. 700 MHz Duplexer equipment required to combine TX and RX into single antenna NIC – to be provided under a separate contract Horizontal Beamwidth set for 90º		2-Channel 700 MHz Transmitter Combiner Existing 800 MHz Transmitter Combiner to be reused	Celwave Model RMC80-184-24 Receiver Multicoupler (804-822 MHz Preselector Filter)

The general design requirements that will be followed for the transmitter combiners, receiver multicouplers, and duplexers to be used by Community Transit are described below for reference purposes only. The Community Transit 700 MHz frequency pairs have at least 1 MHz of frequency separation.

The transmitter combiner systems shall comply with the following general specifications:

- The transmitter combiner design shall include the 2 frequencies at each site.
- Isolator loads shall be sized to protect against damage to the associated transmitter (and isolator) in case of a transmission line or antenna failure at the output of the combiner.
- A means shall be provided to monitor the output power level and VSWR (Voltage Standing Wave Ratio) for each input to the combiner and for the combined output from the combiner.
- Interconnections shall use flexible, low-loss, solid outer conductor transmission line.

The transmitter combiner shall meet the following minimum technical specifications:

Frequency Range	764-776 MHz
Minimum Isolation, Tx-Tx @ 250 kHz	65 dB
Minimum Isolation, Ant-Tx	50 dB
Continuous Power Input, per channel	150 W, minimum
Input Impedance	50 Ohms
Minimum Input Return Loss, all ports	20 dB
Minimum Channel Separation	300 kHz
Temperature Range	-30° to +60° C
Connectors	Type N-female

Receiver multi-couplers shall comply with the following specifications:

- The receiver multicoupler design shall include the 2 700 MHz frequencies at each site.
- Multicoupler systems shall be designed to limit receiver desensitization from Community Transit or other co-located transmitters to no greater than 1 dB.
- All unused ports shall be terminated with a 50-Ohm load.
- Interconnections shall use flexible, low-loss cable.
- The multi-coupler shall have a visual power supply failure alarm indicator with a Form "A" dry contact output.
- A fixed, isolated test port shall be provided.

Minimum multicoupler technical requirements are as follows:

Frequency Range	794-806 MHz
Power Requirement	12 VDC
3rd-order Output Intercept Point	+ 30 dBm
Minimum 1 dB Compression Point	+18 dBm
Minimum System Gain	3 dB
Minimum Rx-Rx Isolation	20 dB
Absolute Intermodulation Suppression	-120 dBm, with two -35 dBm input signals
Temperature Range	-30° to +60° C
Impedance	50 Ohms
Antenna Input Connector	N-female
Receive Output Connector	BNC-female
Minimum Return Loss, all ports	14 dB

Base Station Antennas

The design and configuration of antenna systems for the new 700 MHz data radio system has been optimized to provide coverage equivalent to the coverage of the existing voice radio system, as much as possible. Specifications for TX and RX antennas at each of the Community Transit base station sites are described in the following sections.

The specific antenna systems are intended to replicate as much as possible the antenna patterns and antenna system configuration of the existing Community Transit voice radio system. Approval of the Community Transit's 700 MHz license application by the Region 43 700 MHz Regional Planning Committee is based on specific antenna patterns and antenna system configurations for each site, and approval for Community Transit's use of several of the sites specified herein is based on structural studies assuming specific TX and RX antennas as described.

General Antenna Specifications

Each antenna shall be connected with a dedicated transmission line to the combiner or multi-coupler equipment.

Antennas shall be mounted so as to minimize any pattern distortion caused by tower members,

transmission lines, other antennas, and other objects located near the antenna.

Separate transmit and receive antennas shall be provided. Receive antennas shall be mounted above the transmit antennas as space on the towers permits, unless the Contractor's design can be shown to provide superior performance with an alternate arrangement.

Antennas shall meet or exceed the requirements of Part I of EIA/TIA-329-B.

Multiple-feed antennas for transmitters (having separate elements as part of one structure) may be used to minimize tower loading and allow more space for other antennas.

Antennas shall be high quality, ruggedized models, designed for long-term, high-reliability performance under high wind and ice conditions.

Antennas shall be DC grounded for lightning protection.

Antennas shall be equipped with "N"- type or 7/16" DIN female connectors as integral parts.

Antennas shall be supplied with appropriate mounting clamps.

Details of antenna mounting shall be determined by the Contractor as appropriate for each site, and in coordination with Community Transit.

The Contractor shall provide one spare antenna for each antenna type installed.

Gunsite Ridge and Frailey Mountain, and Gunnysack Hill Transmit Antenna Specifications

At the Gunsite Ridge, Frailey Mountain, and Gunnysack Hill sites, the antenna used in the system design is the Sinclair SE419-SF3P2LDF enclosed 9 dipole panel antenna. The pertinent specifications for this antenna model, which shall be used as the TX antenna only at these three sites are summarized below:

Frequency Range:	746-869 MHz (Broadband - minimum)
Gain:	10.0 dBd
VSWR:	<1.5:1 over frequency range
Polarization:	Vertical
Maximum Input Power:	500 Watts
Azimuth Beamwidth:	185º (half-power)
Elevation Beamwidth:	7.0º (half-power)
Connector:	7/16" DIN female
Weight:	22 lbs (10.0 kg)
Dimensions:	115" H X 2.9" W X 8.5" D
Lateral Thrust:	239 lbs (1063.1 N)
Wind Survival Rating:	175 mph (282 kph) [no ice]

Frailey Mountain, Gunnysack Hill, Gunsite Ridge and Tiger Mountain Receive Antenna Specifications

In order to use existing tower top preamplifiers for both 800 MHz and 700 MHz at the Frailey Mountain and Gunnysack Hill. The existing 800 MHz receive (RX) antennas at both the Frailey Mountain site and the Gunnysack Hill will be replaced with new dual band 700/800 MHz omnidirectional antennas and the

preselector filters in the existing tower top preamplifiers (Celwave Model TTAS80-0281-24) will be either replaced or retuned to cover the required combined receive passband from 804.1875 MHz (the lowest 700 MHz mobile transmit frequency) to 821.1875 (the highest 800 MHz mobile transmit frequency). The same tower top preamplifier and dual band receive antenna will also be installed at the Gunsite Ridge and Tiger Mountain sites.

At the Gunnysack Hill, Frailey Mountain, Gunsite Ridge, and Tiger Mountain sites, the common 700/800 MHz receive (RX) antenna shall be a TXRX CC806-R6 omnidirectional antenna at the Gunnysack site and a TXRX CC806-R6-T5 with 5 degrees of electrical downtilt at the Frailey Mountain, Tiger Mountain and Gunsite Ridge sites. The pertinent specifications for this antenna model, which shall be used as the receive (RX) antenna only at the Gunsite Ridge, Tiger Mountain, Frailey Mountain, and Gunnysack Hill sites are shown below:

Frequency Range:	746-870 MHz (Broadband - minimum)
Gain:	5.0 dBd
VSWR:	<1.5:1 (14 dB Return Loss) over frequency range
Polarization:	Vertical
Maximum Input Power:	500 Watts
Azimuth Beamwidth:	Omnidirectional
Elevation Beamwidth:	17.0º (half-power)
Electrical Downtilt	0º (CC806-R6); 5º (CC806-R6-T5)
Connector:	7/16” DIN female flange mount
Weight:	16 lbs (7.3 kg)
Dimensions:	73” H X 3.0” Diameter
Lateral Thrust @100 mph:	36 lbs (160.1 N)
Wind Survival Rating:	150 mph (241 kph) [no ice]

Tiger Mountain Transmit Antenna Specifications

At the Tiger Mountain site, the antenna used in the system design is the Andrew DB878H120E-A panel antenna. The pertinent specifications for this antenna model, which shall be used for both TX and RX antennas at the Tiger Mountain site are shown below:

Frequency Range:	746-806 MHz (Broadband - minimum)
Gain:	14.0 dBd
VSWR:	<1.5:1 over frequency range
Polarization:	Vertical
Maximum Input Power:	500 Watts
Azimuth Beamwidth:	120º (half-power)
Elevation Beamwidth:	7.0º (half-power)
Connector:	7/16” DIN female

Weight:	25 lbs (11.3 kg)
Dimensions:	96” H X 12.5” W X 5” D
Maximum Wind Area:	5.0 ft2 (0.46 m2)
Maximum Wind Load	284 lbf (1263.2 N) @ 100 mph
Wind Survival Rating:	125 mph (201 kph) [no ice]

Queen Anne Transmit/Receive Antenna Specifications

At the Queen Anne site, the antenna used in the system design is the Kathrein Sinclair SE414-SF3PALDF adjustable beamwidth enclosed 9 dipole panel antenna. This antenna will replace one of the existing 800 MHz panel antennas at the site, which has horizontal and vertical patterns essentially identical to the patterns for this antenna. The pertinent specifications for this antenna model, which shall be used as a duplex TX/RX antenna at the Queen Anne site, are shown below:

Frequency Range:	746-869 MHz (Broadband - minimum)
Gain:	8.0 dBd
VSWR:	<1.5:1 over frequency range
Polarization:	Vertical
Maximum Input Power:	500 Watts
Azimuth Beamwidth:	90º (half-power)
Elevation Beamwidth:	20.0º (half-power)
Connector:	7/16” DIN female
Weight:	23 lbs (10.0 kg)
Dimensions:	53” H X 25” W X 9.5” D
Lateral Thrust:	180 lbs (800.6 N)
Wind Survival Rating:	190 mph (306 kph) [no ice]

Clinton (Heggness Road) Transmit and Receive Antenna Specifications

At the Clinton (Heggness Road) site, the antenna used in the system design is the Sinclair SE414-SF3PALDF enclosed 9 dipole panel antenna. This antenna will replace the existing 800 MHz panel antennas, which have horizontal and vertical patterns identical to the patterns for this antenna. The pertinent specifications for this antenna model, which shall be used for both TX and RX antennas at the Clinton (Heggness Road) site, are shown below:

Frequency Range:	746-869 MHz (Broadband - minimum)
Gain:	8.0 dBd
VSWR:	<1.5:1 over frequency range
Polarization:	Vertical
Maximum Input Power:	500 Watts
Azimuth Beamwidth:	160º (half-power)

Elevation Beamwidth: 20.0º (half-power)

Connector: 7/16" DIN female

Weight: 23 lbs (10.0 kg)

Dimensions: 53" H X 25" W X 9.5" D

Lateral Thrust: 180 lbs (800.6 N)

Wind Survival Rating: 190 mph (306 kph) [no ice]

The antenna mounting elevation, antenna orientation, antenna downtilt, and ERP for the antennas at the 6 Community Transit sites are shown in the following table below:

Site	Antenna Mounting Elevation (feet AGL)	Antenna Orientation ºTrue	Antenna Electrical Downtilt (º)	Antenna Mechanical Downtilt (º)	Maximum Lobe Effective Radiated Power (Watts)
Frailey Mountain TX	160	180	None	-3.0	220
Frailey Mountain RX	Existing 700/800 MHz Antenna and Transmission Line (TXRX CC806-R6-T5 Omnidirectional Antenna with 5º Electrical Downtilt and 7/8" Transmission Line)				
Gunsite Ridge TX	89	255	None	-2.0	200
Gunsite Ridge RX	100	OMNI	-5.0	None	N/A
Clinton (Heggness Road) TX	100 (oriented up on crossarm)	120	None	None	200
Clinton (Heggness Road) RX	100 (oriented down on crossarm)	120	None	None	N/A
Gunnysack Hill TX	72	90	None	None	220
Gunnysack Hill RX	Existing 700/800 MHz Antenna and Transmission Line (TXRX CC806-R6 Omnidirectional Antenna with no downtilt and 7/8" Transmission Line)				
Tiger Mountain TX	65	340	None	-3.0	200
Tiger Mountain RX	85	OMNI	-5.0	None	N/A
Queen Anne TX/RX	97 (on side of building penthouse)	145	None	None	50

Transmission Lines

Transmission lines installed under a separate contract will comply with the following specifications. These specifications are those being provided to the installation contractor who will install the antenna systems. They are included for reference to allow the Contractor under this specification to calculate the transmitter output power required to produce the ERP shown in the table above:

- All transmission lines shall consist of one continuous length, not including transmission line jumpers at the antenna end.

- Transmission Lines – Transmission lines used to connect the antennas to the surge arrestors inside the building at each site shall be RFS LCF78-50A 7/8" solid outer conductor foam dielectric lines, or approved equivalent. (The transmission line at the Gunsite Ridge site will be RFS LCFS114-50A 1-1/4" line for the TX antenna and RFS LCF78-50A 7/8" line for the RX antenna.

- Transmission Line Jumpers - Transmission line jumpers shall be used to connect between the antenna end of each transmission line and the input connector at each antenna. These jumpers shall be of adequate length to provide the appropriate connection without mechanical strain, and shall consist of RFS SCF12-50J superflexible foam dielectric coaxial cable with Type N male connectors or 7/16" DIN male connectors, as appropriate for each antenna. All connections between antennas and jumpers shall be weatherproofed using the cold-shrink weatherproofing kit recommended by the manufacturer, (RFS COLD-021 thru COLD 025 series as appropriate for the antenna connector and jumper/transmission line connections, or approved equivalent).

- Transmission Line Connectors – Transmission line connectors shall be RFS Type N connectors or RFS 7/16" DIN connectors (as appropriate) designed specifically to fit the cable on which the connector is installed. Connections between line sections, antennas, and jumpers shall be weatherproofed using the cold-shrink weatherproofing kit recommended by the manufacturer. All 7/8" transmission lines shall be terminated at the antenna end with a Type N female connector, RFS NF-LCF78-062 RAPID FIT, and terminated at the surge suppressor with a Type N male connector, RFS NM-LCF78-072 RAPDI FIT. All connections between line sections and jumpers shall be weatherproofed using the cold-shrink weatherproofing kit recommended by the manufacturer RFS COLD-021 thru COLD 025 series as appropriate for the antenna connector and jumper/transmission line connections, or approved equivalent).

- Grounding Kits – Use transmission line grounding kits recommended by the manufacturer to bond each transmission line to the tower at the antenna end, to the ground bus bar at the base of the tower, and to the ground bus bar on the outside of the building at the transmission line entry port. Use RFS GKFORM24-78 (24" ground lead) or RFS GKFORM60-78 (60" ground lead) or approved equivalent. Choose ground lead length to be appropriate for the installation situation using the shortest practical route. Install kit following manufacturer's instructions. Weatherproof connections between grounding kit and transmission line using the weatherproofing materials provided with the grounding kit. Connect ground lead to tower at the antenna with Angle Adapter RFS ANGLE-CLPI or approved equivalent. Connect ground lead at tower base and building ground bus bars with 2 each 5/16"x18 x1" bolt with flat washer between bolt and lug and flat washer, split lock washer and nut behind ground bar. Hardware to be C65100 Low-Silicon Bronze. Use conductive grease between lug and ground bar.

- Transmission Line Hangers – Use transmission line hangers recommended by the transmission line manufacturer, RSB-78 for 7/8" transmission line and RSB114 for 1-1/4" transmission line, or approved equivalent, with appropriate tower mounting hardware, compatible with the mechanical configuration of each tower at each of the Community Transit sites.

- Transmission Line Entry Ports – Use existing transmission line entry ports at each building transmission line entry point. Equip entry ports with Valmont Structures transmission line boots or approved equivalent, configured to accommodate three 7/8" transmission lines per boot, if additional boots are required.

- Entry Port Grounding Assembly – Mount surge suppressors immediately inside building entry port. Connect surge arrestor ground leads or ground contacts to interior building ground bar assembly by bolting the bulkhead mounting plate on the surge arrestor directly on to the ground bar assembly.

- Surge Suppressors – Use the following PolyPhaser surge suppressors on incoming transmission lines from 700 MHz or 700/800 MHz antennas. Mount surge suppressors directly to the grounding bar assembly using integral surge side Type N Connectors and appropriate lock washers and nuts.

PolyPhaser IS-50NX-C2 DC Block bulkhead mount surge suppressors shall conform with the following specifications:

Insertion Loss:	≤ 0.1dB
Freq. Range:	125-1000MHz
Mounting:	Bulkhead
Protected Side Connector:	N Female 50Ω
RF Power:	50-375 Watts
Surge Side Connector:	N Female 50Ω
Throughput Energy:	≤ 200.0 µJ
Turn-On Voltage:	600 Volts
Unit Impedance:	50Ω Voltage
Standing Wave Ratio:	1.1 : 1
Weatherized:	No [Weatherize if Required Using PolyPhaser Part #WK-1]

Fixed Site Power Systems

Backup power systems at each site will be provided under a separate contract and will be installed prior to the installation of the new 700 MHz data radio system. These power systems will provide backup power for the new microwave interconnect system equipment and channel banks used to provide voice and data circuits to each of Community Transit's remote sites.

Battery backup power systems at all of Community Transit's remote sites will consist of Newmar IPS-48-11 rectifiers with external 48VDC battery strings rated at XXX Amp-Hours of capacity. Contractor shall provide DC-DC converters as required to provide the appropriate DC voltage to power the 700 MHz radio system equipment provided under this specification. DC-DC Converters shall be Newmar 48-12-30RM (12 VDC output) or 48-12-15RM (24 VDC output), or approved equivalent. The general specifications for these DC-DC converters are shown below:

Regulation:	1% line/load Ripple ±½% peak-peak max
Idle Current:	50mA
Efficiency:	85% typical @ 50% load
Operating Temperature:	-40 to 70°C; Derate linearly from 100% @ 50°C to 50% @ 70°C
Isolation	250 Volts input-output-chassis Protection

Electrical requirements include:

- Input circuit breaker.
- Output fuse.
- Current limited/short circuit proof.
- High/low input voltage shutdown
- Fail-safe components guard against output over-voltage condition.
- Automatic high temperature power reduction starting at 65° C heat sink temp.
- Automatic thermal shut down and recovery @ 85° C heat sink temp. (automatic reset).
- Reverse polarity protection.

Mechanical requirements include:

- Anodized aluminum front panel, vinyl coated aluminum case.
- Mounting brackets provided for 19" or 23" rackmount, flush or 6" forward mount.
- Easy access input/output terminal block on back of unit, with protective cover.
- Front panel switch guard provided.
- Output voltage adjustment potentiometer recessed in front panel.
- Case Size: 3.5 x 19/23 x 14"

Required options include:

- Output Failure Alarm Contacts
- Case Size: 3.5 x 19/23 x 14"

Attachment 5

Potential Smart Bus Stop Park-and-Ride Locations

REQUEST FOR PROPOSALS - RFP #50-07
ADVANCED PUBLIC TRANSPORTATION SYSTEM (APTS) PROCUREMENT
ATTACHMENTS

Park-and-Ride Locations

FACILITY DESIGNATION	LOCATION
MAJOR PARK-AND-RIDES (200-1,300 parking spaces)	
Ash Way	164th Street SW/Ash Way
Canyon Park	22400 17th Avenue SE, Bothell
Eastmont	9029 El Capitan Way, Everett
Edmonds	21300 72nd Avenue W, Edmonds
Lake Stevens	9414 4th Street NE, Lake Stevens
Lynnwood	20101 48th Avenue W, Lynnwood
Mariner	13102 4th Avenue W, Everett
Marysville Ash Ave	6th Street/Ash Avenue, Everett
McCollum Park	620 138th Street SE, Everett
Mountlake Terrace	6101 236th Street SW, Mountlake Terrace
Swamp Creak	16rth Street SW/SR 525, Lynwood
MINOR PARK-AND-RIDES (under 200 parking spaces)	
Arlington	SR 9/ SR 530, Arlington
Goldbar	SR 2/2nd Street, Goldbar
Marysville (South)	2nd Street/Ash Avenue, Marysville
Marysville (North)	116th Street NE/I-5, Marysville
Monroe	17433 SR 2, Monroe
Snohomish	SR 9/Bickford Avenue, Snohomish
Stanwood	Marine Drive/SR 532, Stanwood
Stanwood (I-5)	SR 532/Old Highway 99. Stanwood
Sultan	SR 2, East of Sultan
PARK-AND-RIDES OPERATED BY OTHERS	
Everett Station	3201 Smith Street, Everett
Aurora Village	

RFP #50-07
ADVANCED PUBLIC TRANSPORTATION SYSTEM (APTS) PROCUREMENT

SECTION 3.0

CONTRACT CLAUSES AND GENERAL PROVISIONS

3.00 CHANGES AND VARIANCES

No alterations or variances of any of the terms, conditions, delivery, price, quantities, or specifications of this order shall be effective without written consent of Community Transit's Chief Financial Officer or designee.

3.01 NONWAIVER BY ACCEPTANCE OF VARIATION

No provision of this order, or the right to receive reasonable performance of any act called for by the terms shall be deemed waived by Community Transit of a breach thereof as to any particular transaction or occurrence.

3.02 ORDER OF PRECEDENCE

In the event of any inconsistency between the provisions of the solicitation, the inconsistency shall be resolved by giving precedence in the following order: (a) Specifications as set forth in Section 2.0 of this RFP; (b) Solicitation Instructions and Conditions; (c) General Provisions; and (d) other provisions of the contract whether incorporated by reference or otherwise.

3.03 CONFLICT OF INTEREST STATEMENT

No employee, officer or agent of Community Transit shall participate in selection or in the award or administration of a contract if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when:

A. The employee, officer or agent;

B. Any member of the employee's immediate family;

C. His or her partner; or,

D. An organization that employs or is about to employ,

has a financial or other interest in the firm selected for award.

Community Transit's officers, employees or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from contractors, potential contractors or parties of subagreements.

3.04 STATEMENT OF FINANCIAL ASSISTANCE

The procurement is subject to a financial assistance contract between Community Transit and the U.S. Department of Transportation. The successful Vendor shall comply with all terms and conditions prescribed for third party contracts in the grant contract between the U.S. Department of Transportation and Community Transit and all said terms and conditions shall be deemed incorporated in the contract documents.

New federal laws, regulations, policies, and administrative practices may be established after the date this contract is established and may apply to this contract. To achieve compliance with changing federal requirements, the Contractor agrees to accept all changed requirements that apply to this contract and require subcontractors comply with revised requirements as well. Approximately 6% of this base contract for 2008 will be funded by the FTA. The

percentage of funding provided by the FTA in future optional purchases is subject to FTA approval of future grants.

3.05 DEFINITIONS

As used throughout this contract, the following terms shall have the meaning set forth below:

A. The term *Community Transit* means the Snohomish County Public Transportation Benefit Area Corporation; and the term *duly authorized representative* means any person or persons or board (other than the Contracting Officer) authorized in writing to act for Community Transit.

B. The term *Contracting Officer* means the person executing this contact on behalf of Community Transit or his or her duly appointed successor; and the term includes, except as otherwise provided in this contract, the authorized representative of the Contacting Officer acting within the limits of his or her authority.

C. Except as otherwise provided in this contract, the term *subcontracts* includes purchase orders under this contract.

D. The term *Recipient* means Community Transit.

3.06 INDEPENDENT CONTRACTOR

The Contractor at all times shall be an independent contractor. The Contractor shall be fully responsible for all acts and omissions of its employees, subcontractors, and their suppliers, and shall be specifically responsible for sufficient supervision and inspection to ensure compliance in every respect with the contract requirements. There shall be no contractual relationship between any subcontractor or supplier of the Contractor and Community Transit by virtue of this contract. No provision of this contract shall be for the benefit of any party other than Community Transit and the Contractor.

3.07 RESPONSIBILITY OF CONTRACTOR

A. The Contractor shall be responsible for the professional quality and the coordination of all services furnished by the Contractor under this contract.

B. Neither Community Transit's review, approval, or acceptance of, nor payment for, any of the services required under this contract shall be construed to operate as a waiver of any rights under this contract or any cause of action arising out of the performance of this contract, and the Contractor shall be and remain liable to Community Transit in accordance with applicable law for all damages to Community Transit caused by the Contractor's negligent performance of any of the services furnished under this contract.

C. The rights and remedies of Community Transit provided for under this contract are in addition to any other rights and remedies provided by law.

3.08 COMPOSITION OF CONTRACTOR

If the Contractor hereunder is comprised of more than one legal entity, each such entity shall be jointly and severally liable hereunder.

3.09 APPROVAL OF SUBCONTRACTS

The Contractor shall obtain Community Transits written consent prior to entering each subcontract under this contract.

3.10 ASSIGNMENT AND SUBLETTING

Contractor shall not assign or sublet the service provided under this Agreement, or any part thereof, without the previous written consent of Community Transit, nor shall it assign, by power of attorney or otherwise, any of the monies payable under this Agreement unless by and with the like consent of Community Transit.

In the event consent by Community Transit is given to permit subletting, no such consent shall be construed as making Community Transit a party to such subcontractor or assignee, or of subjecting Community Transit to liability of any kind whatsoever, to any subcontractor. No subcontractor shall, under any circumstances, relieve the Contractor of his liability and obligation under this Agreement and all transactions with Community Transit shall be made through the Contractor. In the event consent is given to assign all, or any part of any money due or to become due under this Agreement, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the rights of the assignee in and to any monies due or to become due to the Contractor shall be subject to all prior liens or all persons, firms, corporations for services rendered or materials supplied for the performance called for by the Contractor in this Agreement.

3.11 CONTRACT PERFORMANCE STANDARDS

The Contractor shall perform all services required by this contract in accordance with the high professional performance requirements as set forth in Section 2.0.

3.12 ADHERENCE TO ESTABLISHED SERVICE AND PERFORMANCE STANDARDS

A. The word *services*, as used in this clause, includes services performed, workmanship, and material furnished or used in performing services.

B. The Contractor shall provide and maintain an inspection system acceptable to Community Transit covering the services under this contract. Complete records of all inspection work performed by the Contractor shall be maintained and made available to Community Transit during contract performance and for as long afterwards as the contract requires.

C. Community Transit has the right to inspect and test all services called for by the contract to the extent practicable at all places and times during the term of the contract. Community Transit shall perform inspections and tests in a manner that will not unduly delay the work.

D. If any of the services performed do not conform with contract requirements, Community Transit may require the Contractor to perform the services again in conformity with contract requirements, for no additional cost. When the defects in services cannot be corrected by performance, Community Transit may (1) require the Contractor to take necessary action to ensure that future performance conforms to contract requirements

and (2) reduce any moneys payable under the contract to reflect the reduced value of the services performed.

E. If the Contractor fails to promptly perform the services again or take the action necessary to ensure future performance in conformity with contract requirements, Community Transit may (1) by contract or otherwise, perform the services and reduce any amounts payable by an amount that is equitable under the circumstances or (2) terminate the contract for default.

3.13 DUTY TO INFORM

If at any time during the performance of this contract, the Contractor becomes aware of actual or potential problems, fault or defect in the project or any nonconformance with any contract document, federal, state, or local law, rule, or regulation, the Contractor shall give immediate written notice thereof to Community Transit's Contracting Officer.

3.14 KEY PERSONNEL

The Contractor shall not, absent prior written notice to, and written consent by, Community Transit remove or reassign any of the key management personnel identified in its submittal at any time prior to or after execution of the contract.

3.15 COMPLIANCE WITH LAW

The Contractor shall perform all work hereunder in compliance with all applicable federal (including, but not limited to, the Americans with Disabilities Act), state, and local laws and regulations. The Contractor shall use only licensed personnel to perform work required by law to be performed by such personnel.

3.16 GOVERNING LAW

The rights, obligations, and remedies of the parties shall be governed by the laws of the State of Washington. Whenever there is no applicable state statute or decisional precedent governing the interpretation of, or disputes arising under or related to, this contract, then federal law, including the law developed by federal boards of contract appeals, the United States Claims Court (formerly the Court of Claims), and the Comptroller General of the United States, shall govern. Venue for any action shall lie in Snohomish County. This is the complete agreement between the parties. If any provision of the contract is found to be invalid or unenforceable, the remaining provisions shall not be impaired.

3.17 HOLD HARMLESS AND INDEMNIFICATION

The Contractor shall defend, indemnify and save harmless Community Transit, its officers, employees and agents from any and every claim and risk, including, but not limited to, suits or proceedings for bodily injuries (including death and emotional claims), patent, trademark, copyright or franchise infringement, and all losses, damages, demands, suits, judgments and attorney fees, and other expenses of any kind, on account of all personal bodily injuries (including death and emotional claims), property damages of any kind, whether tangible or intangible, including loss of use resulting therefrom, in connection with the work performed under this contract, or caused or occasioned in whole or in part by reason of the presence of

the Contractor or its subcontractors, or their property, employees or agents, upon or in proximity to the property of Community Transit, or any other property upon which the Contractor is performing any work called for or in connection with this contract, except only for those losses resulting solely from the negligence of Community Transit, its officers, employees and agents.

Should a court of competent jurisdiction determine that this agreement is subject to RCW 4.24.115, then in the event of liability for damages arising out of bodily injury to persons or damages to property caused by or resulting from the concurrent negligence of the Contractor and Community Transit, its members, officers, employees and agents, the Contractor's liability hereunder shall be only to the extent of the Contractor's negligence. It is further specifically and expressly understood that the indemnification provided herein constitutes Contractor's waiver of immunity under industrial insurance, Title 51 RCW, solely for the purpose of the indemnification. This waiver has been mutually negotiated by the parties.

If a lawsuit in respect to this hold harmless provision ensues, the Contractor shall appear and defend that lawsuit at its own cost and expense, and if judgment is rendered or settlement made requiring payment of damages by Community Transit, its officers, agents, employees and volunteers, the Contractor shall pay the same.

3.18 ROYALTIES AND PATENTS

The Contractor is responsible for paying all license fees, royalties or the costs of defending claims for the infringement of any patented invention, article, process or method artwork, music or other copyright material that may be used in performing this contract or with the completed work. The Contractor and the Contractor's sureties shall indemnify and hold Community Transit, together with its officers and employees, harmless against any and all demands made for such fees, royalties or claims brought or made by the holder of any invention copyright or patent. Before final payment is made on the account of this contract, the contractor shall, if requested by Community Transit, furnish acceptable proof of a proper release from all such fees or claims.

Should the Contractor, its agents, servants or employees, or any of them be enjoined from furnishing or using any invention, copyright, article, material, computer programs, art, music or equipment supplied or required to be supplied or used under the contract, the Contractor shall notify Community Transit in writing and promptly substitute other articles, materials, art, music, computer programs or equipment in lieu thereof of equal efficiency, quality, finish, suitability and market value, and satisfactory in all respects to Community Transit.

3.19 SUSPENSION OF WORK

The Contracting Officer may order the Contractor in writing to suspend all or any part of the work for such period of time as he may determine to be appropriate for the convenience of Community Transit.

3.20 OPTION TO EXTEND TERM

A. Community Transit may extend the terms of this contract by written notice to the Contractor prior to the expiration of their contract or any extension there of. Community Transit will give the Contractor written notice of any intent to extend before the contract expires.

B. If Community Transit exercises this option, the extended contract shall be considered to include this option provision.

3.21 WORKMEN'S COMPENSATION INSURANCE, INDUSTRIAL INSURANCE AND MEDICAL AID PREMIUM

A. The Contractor and his Subcontractors shall maintain Workmen's Compensation and Industrial insurance in the amount and type required by law for all employees employed under this contract who may come within the protection of Workmen's Compensation and Industrial Insurance Laws. In jurisdiction, the Contractor and his Subcontractors shall maintain Employer's Liability insurance in amount, form and company satisfactory to Community Transit for the benefit of all employees not protected by Workmen's Compensation and Industrial Insurance Laws.

B. The Contractor shall make all payments arising from the performance of this contract due the State of Washington pursuant to Titles 50 and 51 of the Revised Code of Washington.

3.22 DEFECTIVE WORK, MATERIALS, OR SERVICES

Prior to final acceptance hereunder, when and as often as Community Transit determines that the work, materials, or services furnished under the contract are not fully and completely in accordance with any requirement of the contract, it may give notice and description of such noncompliance to the Contractor. Within seven calendar days of receiving such written notification, the Contractor must supply Community Transit with a written detailed plan which indicates the time and methods needed to bring the work, materials or services within acceptable limits of the specifications. Community Transit may reject or accept this plan at its discretion. In the event this plan is rejected, the work, materials, or services will be deemed not accepted and returned to the Contractor at the Contractor's expense. This procedure to remedy defects is not intended to limit or preclude any other remedies available to Community Transit by law, including those available under the Uniform Commercial Code, Title 62A RCW.

3.23 PAYMENT FOR CONTRACT SERVICES

Within 30 days of the submission of proper invoices (but not more often than once per month) Community Transit shall pay the Contractor according to the rate(s) stated elsewhere in this contract.

Final payment terms will be determined based on negotiations which will consider other factors e.g. final project schedule, milestones, and acceptance process as provided for in Section 2.

3.24 FEDERAL/STATE AND LOCAL TAXES

Community Transit is not exempt from Washington State Sales Tax. The Contractor shall be responsible to pay all taxes associated with the project, which includes but is not limited to:

State Utility Tax

State Sales and Use Tax on vehicles and other equipment

State B & O Tax

3.25 INSPECTION OF COST DATA

Community Transit shall have the right to examine and audit all books, records, documents and other data of the Proposer related to pricing or performing the contract in order to evaluate the accuracy, completeness and currency of the cost of pricing data. The right of examination shall extend to all documents necessary to permit adequate evaluation of the cost of pricing data submitted, along with the computations and projections used.

3.26 PRICE WARRANTY

The Contractor warrants that the prices charged Community Transit do not exceed the prices charged by the Contractor to any other customer purchasing the same product or service in like or similar quantities, and under similar terms and conditions.

3.27 INSURANCE

A. The Contractor shall take out and maintain during the life of the contract at its own expense worker's compensation insurance by an insurance company licensed to write such insurance in the State of Washington for all of its agents, servants, employees, and personnel who in any way are employed with respect to this project in accordance with the Washington Worker's Compensation Law. In the event that the contractor is approved for self insured Workers Compensation by Washington State Department of Labor and Industries, the Contractor shall furnish to Community Transit certificates evidencing Workers Compensation Insurance not less than the statutory limits required and a copy of Washington State Department of Labor and Industries approval for the self insurance program prior to the commencement of the operation of service.

B. The Contractor shall take out and maintain at the Contractor’s expense, during the life of this Contract such Commercial General Liability and Comprehensive Auto as shall protect it and any subcontractors performing work or services covered by this Contract, and Community Transit and its agents, and employees from any claims of any nature, whether meritorious or otherwise, including property damage which may arise from operations under this Contract, whether such operations be by itself or by any subcontractor or by anyone directly or indirectly employed by either of them, and the amounts of such insurance shall be as follows:

1. Commercial General Liability – Current Accord Standard as of date of issuance in the amount of $1,000,000 per occurrence and $2,000,000 aggregate limit, which provides the following coverages:

    - Premises and Operations

- Explosions, Collapse and Underground Hazards (Where Applicable)
- Products/Completed Operations
- Contractual Liability
- Broad Form Property Damage
- Independent Contractors
- Personal Injury/Advertising Liability
- Stop Gap Liability ($1,000,000 per person/$1,000,000 per occurrence)
- Profession Services, Errors and Omissions ($1,000,000 per occurrence)

2. Comprehensive auto liability in the amount of $1,000,000 per occurrence limit which provides the following coverages:

   - Owned Vehicles
   - Nonowned Vehicles
   - Hired Vehicles

   Deductibles and Self Insured retainers, if any, shall be identified in the Proposal. All deductible payments are the responsibility of Contractor. The minimum deductible shall be $5,000 per occurrence.

3. Professional liability insurance affording limits of liability of $1,000,000 per claim/$1,000,000 aggregate.

   The contractor shall maintain the appropriate professional liability, affording limits of liability of $500,000 each claim and $1,000,000 aggregate for damages sustained by reason of or in the course of operations under the contract, whether occurring by reason of acts, errors or omissions of the contractor.

4. Community Transit reserves the right to require higher limits of coverage for any and/or all coverage required based upon the scope of project. In such event, the contractor shall maintain such higher limits for the occurrence.

C. Community Transit reserves and retains its rights of subrogation.

Community Transit shall further have the right, at its election and expense to pursue collection and recovery from any and all responsible third parties. The Contractor shall cooperate with Community Transit in such recovery and collection, and shall make its records and personnel available.

As to any accident or incident to which this paragraph is applicable, any and all sums so recovered by Community Transit, as provided hereunder, after deduction only of court costs, shall be reimbursed to the Contractor. The pendency of any collection efforts against third parties, including litigation, shall in no way delay or diminish the obligation of the Contractor to promptly remit the sums due to the Authority under the provisions of this Paragraph.

D. The Contractor shall not commence work under this Contract nor shall the Contractor allow any subcontractor to commence work until it has obtained all insurance required under this article and such insurance has been approved by Community Transit.

E. Community Transit shall be named as additional insured on all insurance policy certificates and endorsements. Community Transit reserves the right to increase stated insurance limits on all insurance policies pursuant to this RFQ on a project-by-project basis.

F. The Contractor shall furnish Community Transit with satisfactory written proof of coverage of the insurance (Certificates of Insurance) required prior to commencing any work. Each policy of insurance shall contain the following clauses: It is agreed that these policies shall not be canceled nor the coverage reduced until 45 days after Community Transit shall have received written notice of such cancellation or reduction by certified mail."

G. This Contract is in no way intended to be a third party beneficiary contract and confers no rights on anyone other than Community Transit and the Contractor. Nothing herein shall constitute any imposition or acceptance of any personal obligation or liability not otherwise imposed by law upon or by any individual associated with Community Transit or Contractor.

H. It is expressly agreed and understood that the officers, proprietors, owners, agents, servants, and employees of the Contractor are in no way entitled to any benefits, whatsoever (including so called employees benefits or fringe benefits) from Community Transit.

I. Each contract of insurance required hereunder, including but not limited to extensions and renewals, shall be by companies authorized by the Washington Commission of Commerce and Insurance to enter into such contract of insurance or to transact insurance business in Washington.

J. Prior to execution of the contract, the Contractor shall file with Community Transit evidence of insurance and endorsements from the insurer(s) certifying to the coverage of all insurance required herein. All evidence of insurance must be certified by a properly authorized officer, agent, general agent, or qualified representative of the insurer(s) and shall certify the name of the insured, the type and amount of insurance, the location and operations to which the insurance applies, the expiration date, and that Community Transit received notice at least 45 days prior to the effective date of any cancellation, lapse, or material change in the policy.

K. The Contractor shall, upon demand of Community Transit, deliver to Community Transit all such policy of insurance, and all endorsements and riders, and the receipts for payment of premiums thereon.

Failure to provide such insurance in a timeframe acceptable to Community Transit shall enable Community Transit to suspend or terminate the Contractor's work hereunder in accordance with contract provisions regarding *Termination for Convenience/Default/Nonappropriation*. Suspension or termination of this contract shall not relieve the Contractor from its insurance obligations hereunder.

L. Each insurance policy shall be written on an "occurrence" form; excepting that insurance for professional liability, errors and omissions when required, may be

acceptable on a "claims made" form. If coverage is approved and purchased on a "claims made" basis, the Contractor warrants continuation of coverage, either through policy renewals or the purchase of an extended discovery period, if such extended coverage is available, for not less than three years from the date of completion of the work which is the subject of this contract.

M. No provision of this section shall be construed to limit the liability of the contractor for work not done in accordance with the contract, or implied warranties. The contractor's liability for the work shall extend as far as the appropriate periods of limitation provided by law.

3.28 HAZARDOUS CHEMICAL COMMUNICATION

In order to comply with WAC 296-62-054, Hazard Communication, the Contractor shall submit with the Proposal a Material Safety Data Sheet (MSDS) for all products containing any toxic products that may be harmful to the end user. The MSDS is to accompany the toxic product(s) to the specified delivery sites.

Include the following information in the MSDS:

A. Chemical Abstract Service (CAS) numbers for every chemical that is listed in the MSDS.

B. If the product is actually used diluted, the dilution rate shall be so stated in the MSDS and the hazards and corresponding personal protections, etc., shall also be listed.

C. SARA Title 3 chemicals must be listed with the percentage by weight of the total product.

D. A statement as to the intended use of the product.

3.29 INDUSTRIAL AND HAZARDOUS WASTE

The Contractor shall comply with all applicable local ordinances, state and federal statutes, and supporting rules and regulations governing the discharge of industrial waste to a public sewer, private sewer, or side sewer tributary to the metropolitan sewerage system.

The Contractor shall handle and dispose of all hazardous wastes in compliance with all applicable local, state, and federal laws and regulations, including the Resource Conservation and Recovery Act, the Washington Hazardous Waste Management Act, and applicable rules and regulations of the Environmental Protection Agency and the Department of Ecology governing the generation, storage, treatment, transportation or disposal of hazardous wastes.

3.30 NO WAIVER OF WARRANTIES AND CONTRACT RIGHTS

Conducting of tests and inspections, review of specifications or plans, payment for a product or service, or acceptance of a product or service by Community Transit shall not constitute a waiver, modification or exclusion of any express or implied warranty or any right under this contract or in law.

3.31 CHANGED REQUIREMENTS

New federal, state and county laws, regulations, ordinances, policies and administrative practices may be established after the date this contract is established and may apply to this contract. To achieve compliance with changing requirements, the Contractor agrees to accept all changed requirements that apply to this contract and require subcontractors to comply with revised requirements as well.

3.32 FORCE MAJEURE

Neither Party will be liable for any failure or delay in performing its obligations under the Agreement if such failure or delay is due to unusually severe weather, strikes, natural disasters, fire, civil disturbance, terrorist attacks, epidemic, war, court order, or acts of God. The existence of such causes of delay or failure will extend the period of performance in the exercise of reasonable diligence until after the causes of delay or failure have been removed. Each Party must inform the other in writing with proof of receipt within five (5) business days of the existence of a force majeure event or otherwise waive this right as a defense.

3.33 INTEREST OF MEMBERS OF, OR DELEGATES TO, CONGRESS

In accordance with 18 U.S.C. Section 431, no member of, or delegate to, the Congress of the United States shall be admitted to a share or part of this contract or to any benefit arising therefrom.

3.34 INCORPORATION OF FTA TERMS

The preceding and following provisions include, in part, certain Standard Terms and Conditions required by DOT, whether or not expressly set forth in the preceding contract provisions. All contractual provisions required by DOT, as set forth in FTA Circular 4220.1E as amended, are hereby incorporated by reference. Anything to the contrary herein notwithstanding, all FTA mandated terms shall be deemed to control in the event of a conflict either other provisions contained in this agreement. The Contractor shall not perform any act, fail to perform any act, or refuse to comply with any Community Transit requests which would cause Community Transit to be in violation of the FTA terms and conditions.

The contract agreement shall be binding upon and inure to the benefit of the contract parties, their successors and permitted assigns, but shall not inure to the benefit of any third party or other person.

3.35 NO OBLIGATION BY THE FEDERAL GOVERNMENT

A. The Purchaser and Contractor acknowledge and agree that, notwithstanding any concurrence by the Federal Government in or approval of the solicitation or award of the underlying contract, absent the express written consent by the Federal Government, the Federal Government is not a party to this contract and shall not be subject to any obligations or liabilities to the Purchaser, Contractor, or any other party (whether or not a party to that contract) pertaining to any matter resulting from the underlying contract.

B. The Contractor agrees to include the above clause in each subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that the clause shall not be modified, except to identify the subcontractor who will be subject to its provisions.

3.36 PROGRAM FRAUD AND FALSE OR FRAUDULENT STATEMENTS OR RELATED ACTS

A. The Contractor acknowledges that the provisions of the *Program Fraud Civil Remedies Act of 1986*, as amended, 31 U.S.C. § § 3801 *et seq*., and U.S. DOT regulations, *Program Fraud Civil Remedies*, 49 C.F.R. Part 31, apply to its actions pertaining to this project. Upon execution of the underlying contract, the Contractor certified or affirms the truthfulness and accuracy of any statement it has made, it makes, it may make, or causes to be made, pertaining to the underlying contract or the FTA assisted project for which this contract work is being performed. In addition to other penalties that may be applicable, the Contractor further acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification, the federal government reserves the right to impose the penalties of the *Program Fraud Civil Remedies Act of 1986* on the Contractor to the extent the federal government deems appropriate.

B. The Contractor also acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification to the federal government under a contract connected with a project that is financed in whole or in part with federal assistance originally awarded by FTA under the authority of 49 U.S.C. § 5307, the government reserves the right to impose the penalties of 18 U.S.C. § 5307(n)(1) on the Contractor, to the extent the federal government deems appropriate.

C. The Contractor agrees to include the above two clauses in each subcontract financed in whole or in part with federal assistance provided by FTA. It is further agreed that the clauses shall not be modified, except to identify the subcontractor who shall be subject to the provisions.

3.37 FEDERAL CHANGES

Any proposed change in this contract shall be submitted to Community Transit for its prior approval. Contractor shall at all times comply with all applicable FTA regulations, policies, procedures and directives, including without limitation those listed directly or by reference in the Agreement (Form FTA MA (8) dated October, 2001) between Purchaser and FTA , as they may be amended or promulgated from time to time during the term of this contract. Contractor's failure to so comply shall constitute a material breach of this contract.

3.38 ENERGY CONSERVATION REQUIREMENTS

The contractor agrees to comply with mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act.

3.39 CIVIL RIGHTS REQUIREMENTS

The following requirements apply to the underlying contract:

(1) Nondiscrimination - In accordance with Title VI of the Civil Rights Act, as amended, 42 U.S.C. § 2000d, section 303 of the Age Discrimination Act of 1975, as amended, 42 U.S.C. § 6102, section 202 of the Americans with Disabilities Act of 1990, 42 U.S.C. § 12132, and Federal transit law at 49 U.S.C. § 5332, the Contractor agrees that it will not discriminate against any employee or applicant for employment because of race, color, creed, national

origin, sex, age, or disability. In addition, the Contractor agrees to comply with applicable Federal implementing regulations and other implementing requirements FTA may issue.

(2) Equal Employment Opportunity - The following equal employment opportunity requirements apply to the underlying contract:

(a) Race, Color, Creed, National Origin, Sex - In accordance with Title VII of the Civil Rights Act, as amended, 42 U.S.C. § 2000e, and Federal transit laws at 49 U.S.C. § 5332, the Contractor agrees to comply with all applicable equal employment opportunity requirements of U.S. Department of Labor (U.S. DOL) regulations, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor," 41 C.F.R. Parts 60 et seq ., (which implement Executive Order No. 11246, "Equal Employment Opportunity," as amended by Executive Order No. 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," 42 U.S.C. § 2000e note), and with any applicable Federal statutes, executive orders, regulations, and Federal policies that may in the future affect construction activities undertaken in the course of the Project. The Contractor agrees to take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, creed, national origin, sex, or age. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.

(b) Age - In accordance with section 4 of the Age Discrimination in Employment Act of 1967, as amended, 29 U.S.C. § § 623 and Federal transit law at 49 U.S.C. § 5332, the Contractor agrees to refrain from discrimination against present and prospective employees for reason of age. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.

(c) Disabilities - In accordance with section 102 of the Americans with Disabilities Act, as amended, 42 U.S.C. § 12112, the Contractor agrees that it will comply with the requirements of U.S. Equal Employment Opportunity Commission, "Regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act," 29 C.F.R. Part 1630, pertaining to employment of persons with disabilities. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.

(3) The Contractor also agrees to include these requirements in each subcontract financed in whole or in part with Federal assistance provided by FTA, modified only if necessary to identify the affected parties.

3.40 FLY AMERICA REQUIREMENTS

The Contractor agrees to comply with 49 U.S.C. 40118 (the “Fly America” Act) in accordance with the General Services Administration’s regulations at 41 CFR Part 301-10, which provide that recipients and subrecipients of Federal funds and their contractors are required to use U.S. Flag air carriers for U.S Government-financed international air travel and transportation of their personal effects or property, to the extent such service is available, unless travel by foreign air carrier is a matter of necessity, as defined by the Fly America Act. The Contractor shall submit, if a foreign air carrier was used, an appropriate certification or memorandum adequately explaining why service by a U.S. flag air carrier was not available or why it was necessary to use a foreign air carrier and shall, in any event, provide a certificate of

compliance with the Fly America requirements. The Contractor agrees to include the requirements of this section in all subcontracts that may involve international air transportation.

3.41 CARGO PREFERENCE REQUIREMENTS – USE OF UNITED STATES-FLAG VESSELS

The Contractor agrees: a. to use privately owned United States-Flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo lines, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to the underlying contract to the extent such vessels are available for fair and reasonable rates for United States-Flag commercial vessels; b. to furnish within 20 working days following the date of loading for shipments originating within the United States or within 30 working days following the date of leading for shipments originating outside the United States, a legible copy of a rated, "on-board" commercial ocean bill-of-lading in English for each shipment of cargo described in the preceding paragraph to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590 and to the FTA recipient (through the contractor in the case of a subcontractor's bill-of-lading) c. to include these requirements in all subcontracts issued pursuant to this contract when the subcontract may involve the transport of equipment, material, or commodities by ocean vessel.

3.42 BUY AMERICA REQUIREMENTS

The contractor agrees to comply with 49 U.S.C. 5323(j) and 49 CFR Part 661, which provide that Federal funds may not be obligated unless steel, iron, and manufactured products used in FTA-funded projects are produced in the United States, unless a waiver has been granted by FTA or the product is subject to a general waiver. General waivers are listed in 49 CFR 661.7, and include final assembly in the United States for 15 passenger vans and 15 passenger wagons produced by Chrysler Corporation, microcomputer equipment, software, and small purchases (currently less than $100,000) made with capital, operating, or planning funds. Separate requirements for rolling stock are set out at 5323(j)(2)(C) and 49 CFR 661.11. Rolling stock not subject to a general waiver must be manufactured in the United States and have a 60 percent domestic content.

A bidder or offeror must submit to the FTA recipient the appropriate Buy America certification with all bids on FTA-funded contracts, except those subject to a general waiver. Bids or offers that are not accompanied by a completed Buy America certification must be rejected as non-responsive. This requirement does not apply to lower tier subcontractors.

3.43 DISPUTES

A. Except as otherwise provided in this RFP, any dispute concerning a question which is not disposed of by agreement shall be decided by the Contracting Officer, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the Contractor. The decision of the Contracting Officer shall be final and conclusive unless, on or before the 90th day from the date of receipt of such copy, the Contractor mails or otherwise furnishes a written appeal addressed to Chief Executive Officer of Community Transit.

The decision of Community Transit's Chief Executive Officer on such appeal shall be final and conclusive unless determined by a court of competent jurisdiction to have been fraudulent, capricious, arbitrary, so grossly erroneous as necessarily to in bad faith, or not supported by substantial evidence. No action challenging such decision shall be brought more than one year from the date of the Contractor's receipt of such decision. In connection with any appeal of the Contracting Officer's decision, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of its appeal. Pending the final resolution of a dispute hereunder, the Contractor shall proceed diligently with the performance of the contract and in accordance with the Contracting Officer's decision.

B. If it is determined, on appeal, that the Contracting Officer's interpretation of the contract, direction to the Contractor, or any other action required by the Contracting Officer's decisions was an erroneous determination of the rights and obligations of the parties under the contract, the Contractor's remedy shall be the same as if such action were a change order under the Changes Clause of this contract.

3.44 TERMINATION

A. Termination for Convenience

Community Transit may terminate this contract, in whole or in part, at any time by written notice to the Contractor. The Contractor shall be paid for the contract price for supplies delivered and accepted, or services performed in accordance with the manner of performance set forth in the contract up to the time of termination. The Contractor shall promptly submit its termination claim to Community Transit to be paid the Contractor. If the Contractor has any property in its possession belonging to Community Transit, the Contractor will account for same and dispose of it in the manner Community Transit directs.

B. Termination for Default

If the Contractor does not deliver supplies in accordance with the contract delivery schedule, or if the contract is for services, the Contractor fails to comply with any other provisions of the contract, Community Transit may terminate this contract for default. Termination shall be effected by serving a notice of termination on the Contractor setting forth the manner in which the Contractor is in default.

The Contractor covenants and agrees that in the event suit is instituted by Community Transit for any default on the part of the Contractor and the Contractor is adjudged by court of competent jurisdiction to be in default, the Contractor shall pay to Community Transit all costs, expenses expended or incurred by Community Transit in connection therewith, and reasonable attorney's fees. The Contractor agrees that the Superior Court of the State of Washington shall have jurisdiction over any such suit and that venue shall be made in Snohomish County.

If it is later determined by Community Transit that the Contractor had an excusable reason for not performing, such as a strike, fire, or flood, events which are not the fault of or are beyond the control of the Contractor; Community Transit, after setting up a new delivery of performance schedule, may allow the Contractor to continue work, or treat the termination as a termination for convenience.

C. Termination for Breach

In the event of a breach by the Contractor of any of the provisions of this contract, Community Transit reserves the right to cancel and terminate this contract forthwith upon giving oral or written notice to the Contractor. The Contractor shall be liable for damages suffered by Community Transit resulting from the Contractor's breach of contract.

D. Termination for Non-appropriation

If expected or actual funding is withdrawn, reduced or limited in any way prior to the termination date set forth in this Contract or in any amendment hereto, Community Transit may, upon written notice to the Contractor, terminate this Contract in whole or in part. Such termination shall be in addition to Community Transit's rights to terminate for convenience or default.

3.45 ACCESS TO RECORDS AND REPORTS

Community Transit, the Comptroller General of the United States, or any of their duly authorized representatives, shall, until six years after final payment under this contract or for any shorter period specified, have access to and the right to examine any of the Contractor's directly pertinent books, documents, papers or other records involving transactions related to this contract, and may request copies of specific documents at no charge to Community Transit.

If it is apparent that there will be substantial subcontracting, your organization shall include clauses that impose these same requirements on any subcontractor. Thus, there shall be a clause requiring submission of cost and pricing data by subcontractors, a clause permitting examination of cost and pricing data before award and a clause permitting examination of records during the administration of the contract for all subcontractors.

Failure to include the above three clauses could subsequently result in:

A. The Contractor's failure to submit cost data; or,

B. Refusal by the Contractor to provide such data; or

C. Refusal by the Contractor to allow the grantee access to the records of the Contractor.

Also, failure to include the examination of records provision in negotiated contracts is a violation of FTA Circular 4220.1D.

3.46 OWNERSHIP OF PRODUCTS

All work performance and services provided by the Contractor under this agreement and the final by-products of such shall be the property of Community Transit. All reports, specifications, drawings, graphical representations, and electronic data pertaining to same, developed by the Contractor or in conjunction wit this contract, shall be surrendered to Community Transit at the conclusion of this contract upon request in both paper and electronic form. The Contractor expressly waives all copyright privileges to such information, and Community Transit may use or modify same without any additional payment to the Contractor.

Any reuse of work prepared by the Contractor shall be solely at Community Transit's risk with no liability to the Contractor.

All drawings shall be prepared on a current AutoCAD release. All written documentation shall be prepared in MS Word, MS Excel, MS Visio (diagrams) or other approved programs, with a copy in Adobe Acrobat form. All project schedule information shall be maintained and updated in MS Project. Any data used in, or developed as a result of, this contract shall be revealed to no one except Community Transit without the expressed consent of Community Transit.

3.47 RECYCLED PRODUCTS

The contractor agrees to comply with all the requirements of Section 6002 of the Resource Conservation and Recovery Act (RCRA), as amended (42 U.S.C. 6962), including but not limited to the regulatory provisions of 40 CFR Part 247, and Executive Order 12873, as they apply to the procurement of the items designated in Subpart B of 40 CFR Part 247.

3.48 DISCLOSURE OF LOBBYING ACTIVITIES

Byrd Anti-Lobbying Amendment, 31 U.S.C. 1352, as amended by the Lobbying Disclosure Act of 1995, P.L. 104-65 [to be codified at 2 U.S.C. § 1601, et seq.] - Contractors who apply or bid for an award of $100,000 or more shall file the certification required by 49 CFR part 20, "New Restrictions on Lobbying." Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier shall also disclose the name of any registrant under the Lobbying Disclosure Act of 1995 who has made lobbying contacts on its behalf with non-Federal funds with respect to that Federal contract, grant or award covered by 31 U.S.C. 1352. Such disclosures are forwarded from tier to tier up to the recipient.

3.49 PRIVACY ACT

A. Community Transit and Contractor agree:

(1) To comply with the Privacy Act of 1974, 5 U.S.C. Section 552a (the Act) and the rules and regulations issued pursuant to the Act when performance under the contract involves the design, development or operation of any system of records on individuals to be operated by Community Transit, its Contractors, or employees to accomplish a government function.

(2) To notify the Government when Community Transit or Contractor anticipates operating a system of records on behalf of the government in order to accomplish the requirements of this agreement, if such system contains information about individuals which information will be retrieved by the individual's name or other identifier assigned to the individual. A system of records subject to the Act may not be employed in the performance of this Agreement until the necessary approval and publication requirements applicable to the system have been carried out. Community Transit or Contractor, as appropriate, agrees to correct, maintain, disseminate and use such records in accordance with the requirements

of the Act and to comply with all applicable requirements of the Act.

(3) To include the Privacy Act Notification contained in this agreement in every subcontract solicitation and in every subcontract when the performance of work under the proposed subcontract may involve the design, development or operation of a system of records on individuals that is to be operated under the contract to accomplish a government function.

(4) To include this clause, including this paragraph, in all subcontracts under which work for this agreement is performed or which is awarded pursuant to this agreement or which may involve the design, development or operation of such a system of record on behalf of the government.

B. For purposes of the Privacy Act, when the Agreement involves the operation of a system of records on individuals to accomplish a Government function, Community Transit, third party contractors and any of their employees is considered to be an employee of the Government with respect to the Government function and the requirements of the Act, including the civil and criminal penalties for violations of the Act, are applicable except that the criminal penalties shall not apply with regard to contracts effective prior to September 27, 1975. In addition, failure to comply with the provisions of the Act or of this clause make this Agreement subject to termination.

C. The terms used in this clause have the following meanings:

(1) *Operation of a system of records* means performance of any of the activities associated with maintaining the system of records on behalf of the Government including the collection, use and dissemination of records.

(2) *Record* means any item, collection or grouping of information about an individual that is maintained by Community Transit or Contractor on behalf of the Government including, but not limited to, his education, financial transactions, medical history and criminal or employment history that contains his name or the identifying number, symbol or other identification particularly assigned to the individual, such as a finger or voice print or a photograph.

(3) *System of records* on individuals means a group of any records under the control of Community Transit or Contractor on behalf of the Government from which information is retrieved by the name of the individual or by some identifying number, symbol or other identification in particular assigned to the individual.

3.50 CLEAN AIR REQUIREMENTS

A. The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. §§ 7401 et seq . The Contractor agrees to report each violation to the Purchaser and understands and agrees that the Purchaser will, in turn, report each violation as required to assure notification to FTA and the appropriate EPA Regional Office.

B. The Contractor also agrees to include these requirements in each subcontract exceeding $100,000 financed in whole or in part with Federal assistance provided by FTA.

3.51 CLEAN WATER REQUIREMENTS

A. The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq . The Contractor agrees to report each violation to the Purchaser and understands and agrees that the Purchaser will, in turn, report each violation as required to assure notification to FTA and the appropriate EPA Regional Office.

B. The Contractor also agrees to include these requirements in each subcontract exceeding $100,000 financed in whole or in part with Federal assistance provided by FTA.

3.52 GOVERNMENT-WIDE DEBARMENT AND SUSPENSION

The Contractor, including any of its officers or holders of a controlling interest, is obligated to inform the Recipient (Community Transit) whether or not it is or has been on any debarred bidders' list maintained by the United States Government. Should the Contractor be included on such a list during the performance of this project, it shall so inform the Recipient.

3.53 DISADVANTAGED BUSINESS ENTERPRISES (DBE) DEFINITIONS

A. **DBE** is an incorporated or unincorporated small business concern or joint venture, as defined by Section 3 of the Small Business Act and implementing regulations, except that a small business concern shall not include any concern or group of concerns controlled by the same socially and economically disadvantaged individual or individuals which has annual average gross receipts in excess of $14 million over the previous three fiscal years. The Secretary shall adjust this figure from time to time for inflation. A DBE must be certified by the Washington State Office of Minority and Women's Business Enterprises.

(1) At least 51 percent of which is owned by one or more socially and economically disadvantaged individuals or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more socially and economically disadvantaged individuals; and,

(2) The management and daily business operations of which are controlled by the socially and economically disadvantaged individuals who own the business.

B. **Socially and Economically Disadvantaged Individuals** are those individuals who are citizens of the United States (or lawfully admitted permanent residents) and who are:

(1) *Black Americans* - which includes persons having origins in any of the black racial groups of Africa;

(2) *Hispanic Americans* - which includes persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish or Portuguese culture or origin, regardless of race;

(3) *Native Americans* - which includes persons who are American Indians, Eskimos, Aleuts or Native Hawaiians;

(4) *Asian-Pacific Americans* - which includes persons whose origins are from Japan, China, Taiwan, Korea, Vietnam, Laos, Cambodia, the Philippines, Samoa, Guam, the U.S. Trust Territories or the Pacific and the Northern Marianas;

(5) *Asian-Indian Americans* - which includes persons whose origins are from India, Pakistan and Bangladesh;

(6) *Women* - regardless of race, ethnicity or origin; and,

(7) *Other* - individuals found to be socially and economically disadvantaged by the Small Business Administration (SBA) pursuant to Section 8(a) of the Small Business Act.

3.54 DISADVANTAGED BUSINESS ENTERPRISES

A. This contract is subject to the requirements of Title 49, Code of Federal Regulations, Part 26, *Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs.* The national goal for participation of DBEs is 10%. The agency's overall goal for DBE participation is 0.708%. A separate contract goal has not been established for the procurement.

B. The successful proposer will be required to report its DBE participation obtained through race-neutral mans throughout the period of performance.

C. The contractor must promptly notify Community Transit, whenever a DBE subcontractor performing work related to this contract is terminated or fails to complete its work, and must make good faith efforts to engage another DBE subcontractor to perform at least the same amount of work. The contractor may not terminate any DBE subcontractor and perform that work through its own forces or those of an affiliate without prior written consent of Community Transit.

3.55 AFFIRMATIVE EFFORTS TO SOLICIT DBE PARTICIPATION

DBE firms shall have equal opportunity to compete for and perform subcontracts which the Contractor enters into pursuant to this contract. Contractors are encouraged to:

1. Advertise opportunities for subcontractors or suppliers in a manner reasonably designed to provide DBEs capable of performing the work with timely notice of such opportunities. All advertisements should include a provision encouraging participation by DBE firms and may be done through general advertisements (e.g. newspapers, journals, etc.) or by soliciting bids/proposals directly from DBEs.
2. Utilize the services of available minority community-based organizations, minority contractor groups, local minority assistance offices and organizations that provide assistance in the recruitment and placement of DBEs and other small businesses, such as the Office of Minority and Women's Business Enterprises listed below.
3. Establish delivery schedules, where requirements of the contract allow, that encourage participation by DBEs and other small businesses.
4. Achieve attainment through joint ventures.

In the absence of a mandatory goal, all DBE participation that is attained on this project will be considered as "race neutral" participation and will be reported as such.

3.56 INFORMATION REGARDING DBEs

Information regarding Disadvantaged Business Enterprises currently certified with the State of Washington is available at:

Office of Minority and Women's Business Enterprises
406 South Water Street
PO Box 41160
Olympia, WA 98504-1160
Main Line: (360) 753-9693
Help Line: (360) 753-9697

Or visit their website at http://www.omwbe.wa.gov/

3.57 PROCEDURES BETWEEN AWARD AND EXECUTION

After award of the contract, the successful proposer shall provide the following additional information:

A list of all firms who submitted a bid or proposal in an attempt to participate in this project whether they were successful or not. Include the correct business name, federal employer identification number (optional), and a mailing address.

3.58 REQUIRED DBE CONTRACT CLAUSES

Pursuant to Community Transit's DBE policy, the following clauses will apply to all Contractors and Subcontractors:

A. Contract Assurance

The following clause is incorporated in every DOT-assisted contract and subcontract:

The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate.

B. Prompt Payment

The following clause is incorporated in every DOT-assisted prime contract:

The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than thirty days from the receipt of each payment the prime contractor receives from Community Transit. The prime contractor further agrees to return retainage payments to each subcontractor within thirty days after the subcontractor's work is satisfactorily completed. Any delay or postponement of payment from the above-referenced time frame may

occur only for good cause following written approval by Community Transit. This clause applies to both DBE and non-DBE subcontractor.

3.59 RESPONSIBILITY OF THE CONTRACTOR

a) The Contractor shall be responsible for the professional quality, technical accuracy, and the coordination of all designs, specifications, and other services furnished by the Contractor under this contract. The Contractor shall, without additional compensation, correct or revise any errors or deficiencies in its designs, drawings, specifications, and other services.

b) Neither Community Transit's review, approval or acceptance of, nor payment for, the services required under this contract shall be construed to operate as a waiver of any rights under this contract or of any cause of action arising out of the performance of this contract, and the Contractor shall be and remain liable to Community Transit in accordance with applicable law for all damages to Community Transit caused by the Contractor's negligent performance of any of the services furnished under this contract.

c) The rights and remedies of Community Transit provided for under this contract are in addition to any other rights and remedies provided by law.

d) If the Contractor is comprised of more than one legal entity, each such entity shall be jointly and severally liable hereunder.

3.60 WORK OVERSIGHT

The extent and character of the work to be done by the Contractor shall be subject to the general oversight, supervision, direction, control, and approval of the Contracting Officer or designee.

3.61 (RESERVED)

3.62 WARRANTY OF CONTRACTOR CAPABILITY

Contractor warrants that it is financially capable of fulfilling all requirements of this Agreement, that there are no legal proceedings against it that could threaten performance of this Agreement, that the Contractor is a validly organized entity to enter into the Agreement. Further, Contractor is not prohibited by any contractor loan, contract, financing arrangement, etc. for entering into this Agreement.

3.63 RISK OF LOSS

A. Risk of Loss through Acceptance Date

Contractor shall bear the full and complete risk of, and shall relieve Community Transit of all risks of, loss, damage, theft, or destruction (whether partial or complete) of, to and/or from the Products covered by this Agreement until the Acceptance Date for such Product. Contractor shall maintain, through the Acceptance Date, at no expense to Community Transit, coverage of an amount not less than that reasonably required to replace each Product in the event of loss, damage, theft, or destruction. Community Transit shall be

B. Responsibility after Acceptance Date

Except as may be expressly specified otherwise in the Agreement, Community Transit shall be responsible for any and all risk of loss to each Product after the Acceptance Date thereof; provided, however, that Contractor shall remain liable for, and shall relieve Community Transit of, any and all risk of loss from any damage or loss caused by the fault or negligence of Contractor or its subcontractors, agents, or representatives.

C.. Vendor Responsibility after Acceptance Date

After the completion of the acceptance testing period and Community Transit has accepted the product or services. If the product or services affect any other applications or system, the Contractor is not released from his responsibility if an acceptance tested product functions and impacts our other systems negatively.

3.64 SOURCE CODE

Contractor agrees to keep, and maintain current, a copy of source code purchased in escrow with Community Transit and an escrow agent. The escrow agent is authorized to release the source code should the Contractor, for any reason, cease to do business upon payment of accrued fees by Community Transit.

In the event that the Contractor should cease to do business, the software license shall convert into a paid up perpetual license.

3.65 PARTS AVAILABILITY ASSURANCE

The Contractor shall guarantee a secure and readily available supply of all spare parts necessary or desirable for the equipment provided under this Contract for a minimum of ten (10) years from the date of the expiration of warranty.

RFP #50-07
ADVANCED PUBLIC TRANSPORTATION SYSTEM (APTS) PROCUREMENT

SECTION 4.0

MANDATORY FORMS AND DOCUMENTS

4.00

INVITATION TO PROPOSERS
COMMUNITY TRANSIT
DEPARTMENT OF FINANCE AND ADMINISTRATIVE SERVICES
(425) 348-7100

Date Issued: August 14, 2007 Due Date: October 5, 2007 at 2:00 p.m.

F.O.B. Delivery Point:

7100 Hardeson Road
Everett, WA 98203
Attn: Gerhild Turner, CPPO, CPPB
Procurement Supervisor

Project Name**:** **RFP #50-07, ADVANCED PUBLIC TRANSPORTATION SYSTEM (APTS) PROCUREMENT**

PER SPECIFICATIONS OF SUBJECT SOLICITATION.

By responding to this solicitation, Proposers agree to be bound by all legal requirements and contract terms and conditions contained in this document. Proposers also acknowledge receipt and understanding of any and all addenda issued for this solicitation.

A completed copy of this form, *signed by an individual authorized to legally commit the Proposer's company* shall be submitted as the cover page of each proposal submitted.

PROPOSALS MUST BE SIGNED TO BE ACCEPTED

Company Name: _____

By: _____ Title: _____
(Signature of Authorized Official)

_____
Printed Name of Authorizing Official

Address: _____ City, State, Zip Code _____

Telephone Number_____ E-mail address_____

4.01 CERTIFICATE OF NONDEBARMENT / SUSPENSION

Project Name**: RFP #50-07, ADVANCED PUBLIC TRANSPORTATION SYSTEM (APTS) PROCUREMENT**

CERTIFICATION REGARDING DEBARRMENT, SUSPENSION AND OTHER INELIGIBILITY AND VOLUNTARY EXCLUSION LOWER TIER COVERED TRANSACTIONS

The Lower Tier Participant (Applicant for a third party subcontract or subgrant under an FTA project), _____ hereinafter referred to as *Contractor,* certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarrment, declared ineligible or voluntarily excluded from participation in this transaction by any federal department or agency.

Where the Contractor is unable to certify to any of the statements in this certification, such Contractor shall attach an explanation to this proposal.

The Contractor, _____, certifies or affirms the truthfulness and accuracy of the contents of the statements submitted on or with this certification and understands that the provisions of 31 U.S.C. Section 3801 et seq. are applicable thereto.

_____
Signature of Authorized Official

_____ _____
Title of Authorized Official Date

THIS FORM SHALL BE COMPLETED BY THE PRIME CONTRACTOR AND ANY SUBCONTRACTORS THAT WILL BE AFFILIATED WITH THE WORK IN THIS PROPOSAL. RETURN ALL COMPLETED FORMS WITH ORIGINAL PROPOSAL PACKAGE.

4.02 CONFLICT OF INTEREST AFFIDAVIT

Project Name**: RFP #50-07, ADVANCED PUBLIC TRANSPORTATION SYSTEM (APTS) PROCUREMENT**

SNOHOMISH COUNTY PUBLIC TRANSPORTATION BENEFIT AREA CORPORATION (DBA Community Transit) AFFIDAVIT CONCERNING CONFLICTS OF INTEREST AND NONCOMPETITIVE PRACTICES

STATE OF _____COUNTY OF _____
The undersigned, being first duly sworn on oath, states on behalf of the Contractor:

A. Conflict of Interest

That the Contractor by entering into this contract with Community Transit is to perform or provide work, services or materials to Community Transit has thereby covenanted, and by this affidavit does again covenant and assure, that it has no direct or indirect pecuniary or proprietary interest, and that it shall not acquire any such interest, which conflicts in any manner or degree with the services required to be performed under this contract and that it shall not employ any person or agent having any such interest. In the event that the Contractor or its agents, employees or representatives hereafter acquires such a conflict of interest, it shall immediately disclose such interest to Community Transit and take action immediately to eliminate the conflict or to withdraw from this contract, as Community Transit may require.

B. Contingent Fees and Gratuities

That the Contractor, by entering into this contract with Community Transit to perform or provide services or materials for Community Transit has thereby covenanted, and by this affidavit does again covenant and assure:

1. That no person or selling agency except employees or designated agents or representatives of the Contractor has been employed or trained to solicit or secure this contract with an agreement or understanding that a commission, percentage, brokerage, or contingent fee would be paid; and
2. That no gratuities, in the form of entertainment, gifts or otherwise, were offered or given by the Contractor or any of its agents, employees or representatives, to any official, member or employee of Community Transit or other governmental agency with a view toward securing this contract or securing favorable treatment with respect to the awarding or amending, or the making of any determination with respect to the performance of this contract.

Company Name _____

By _____

Title _____

Subscribed and Sworn to Before Me this _____ day of _____, 20___.

Notary Public in and for the State of _____.

residing at _____.

4.03 CERTIFICATION REGARDING LOBBYING BY CONTRACTOR

Project Name**: RFP #50=-7, Advanced Public Transportation System (APTS) Procurement**

Pursuant to 40 CFR Part 34 (which is by this reference incorporated herein), the undersigned certifies, to the best of his or her knowledge and belief, that:

A. No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with the awarding of any federal contract, the making of any federal grant, the making of any federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan, or cooperative agreement.

B. If any funds other than federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL *Disclosure Form to Report Lobbying*, in accordance with its instructions.

C. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

The Contractor, _____, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. A 3801, *et seq., apply* to this certification and disclosure, if any.

Signature of Contractor	Print Name
Title	Address
Date	City State Zip

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

DISCLOSURE OF LOBBYING ACTIVITIES
Complete this form to disclose Lobbying activities pursuant to 31 U.S.C. 1352

Project Name**:** **RFP #50-07, Advanced Public Transportation System (APTS) Procurement**

<table>
<tr><td>1. Type of Federal Action: ☐
a. Contract
b. Grant
c. Cooperative agreement
d. Loan
e. Loan guarantee
f. Loan insurance</td><td>2. Status of Federal Actions☐
a. Proposal/offer/application
b. Initial award
c. Post-award</td><td>3. Report Type: ☐
a. Initial filing
b. Material change

For Material Change Only:
year _____quarter
Date of last report</td></tr>
<tr><td colspan="2">4. Name and Address of Reporting Entity:
☐ Prime ☐ Subawardee
Tier ____, if known:

Congressional District, if known:</td><td>5. If Reporting Entity on No. 4 is Subawardee, Enter
Name and Address of Prime:

Congressional District, if known:</td></tr>
<tr><td colspan="2">6. Federal Department/Agency:</td><td>7. Federal Program Name/Description:

CFDA Number, if applicable:</td></tr>
<tr><td colspan="2">8. Federal Action Number, if known:</td><td>9. Award Amount, if known:
$</td></tr>
<tr><td colspan="2">10. a. Name and Address of Lobbying Entity
(If individual, Last Name, First Name, MI)</td><td>b. Individuals Performing Services (including address if different from No. 10a.)
(Last Name, First Name, MI)</td></tr>
<tr><td colspan="2">11. Amount of Payment (check all that apply):
$_____ ☐ actual ☐ planned

12. Form of Payment (check all that apply):
☐ a. Cash
☐ b. In-kind; specify: Nature

Value</td><td>13. Type of Payment (check all that apply):
☐ a. Retainer
☐ b. One-time fee
☐ c. Commission
☐ d. Contingent fee
☐ e. Deferred
☐ f. Other; specify:</td></tr>
<tr><td colspan="3">14. Brief Description of Services Performed or to be Performed and Date(s) of Service, including officer(s), employee(s), or Member(s) contacted for Payment indicated in item 11:

(Attach Continuation Sheet(s) SF-LLL-A if necessary)</td></tr>
</table>

15. Continuation Sheet(s) SF-LLL-A attached: ☐ Yes ☐ No	
	Signature: _____Print Name: _____Title: Telephone No: _____Date:
Federal Use Only:	

Reporting Entity: _____ Page

4.04 CERTIFICATION REGARDING LOBBYING BY SUBCONTRACTOR

Project Name**: RFP #50-07, Advanced Public Transportation System (APTS) Procurement**

Pursuant to 40 CFR Part 34 (which is by this reference incorporated herein), the undersigned certifies, to the best of his or her knowledge and belief, that:

A. No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with the awarding of any federal contract, the making of any federal grant, the making of any federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan, or cooperative agreement.

B. If any funds other than federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form - LLL, *Disclosure Form to Report Lobbying*, in accordance with its instructions.

C. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

Signature of Contractor	Print Name
Title	Address
Date	City State Zip

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

THIS FORM MUST BE COMPLETED BY ANY SUBCONTRACTORS THAT WILL BE AFFILIATED WITH THE WORK IN THIS PROPOSAL. RETURN ALL COMPLETED FORMS WITH ORIGINAL PROPOSAL PACKAGE.

4.05 BUY AMERICA CERTIFICATION

Project Name**: RFP #50-07, Advanced Public Transportation System (APTS) Procurement**

CERTIFICATE OF COMPLIANCE WITH 49 U.S.C. 5323(J)(2)(C).

The Proposer or offeror hereby certifies that it will comply with the requirements of 49 U.S.C. 5323(j)(2)(C) and the regulations at 49 CFR Part 661.

Date _____

Signature _____

Title _____

Company Name _____

OR

CERTIFICATE OF NON-COMPLIANCE WITH 49 U.S.C. 5323(J)(2)(C)

The Proposer or offeror hereby certifies that it cannot comply with the requirements of 49 U.S.C. 5323(j)(2)(C), but may qualify for an exception pursuant to 49 U.S.C. 5323(j)(2)(B) or (j)(2)(D) and the regulations in 49 CFR 661.7.

Date _____

Signature _____

Title _____

Company Name _____

4.06 PRICE SHEET RFP #50-07, ADVANCED PUBLIC TRANSPORTATION SYSTEM (APTS) PROCUREMENT

Item/Description	Quant	Unit (ea or ls)	Unit Price (USD)	Extended Price (USD)
PART 1: REQUIRED ITEMS				
PROJECT SERVICES				
Performance Bond		ls		
Project Management, Schedule, Reporting		ls		
System Design Document		ls		
Data Radio Submittals		ls		
Shop Drawings and Material Selection Docs		ls		
Installation Manuals and Documents		ls		
Operations Manuals and Documents		ls		
Maintenance Manuals and Documents		ls		
Test Plans and Results		ls		
Training Materials		ls		
			Subtotal Project Services	
ONBOARD SYSTEMS (installation costs separate)				
Vehicle Logic Unit		ea		
Automatic Vehicle Location		ea		
Fixed Route Mobile Data Terminal		ea		
Paratransit Mobile Data Terminal		ea		
Automatic Passenger Counter		ea		
Automatic Stop Annunciation		ea		
Optional ASA Functionality		ls		
Emergency Alarm (Paratransit)		ea		
Remote Dispatch Terminal		ea		
TSP, Destination Sign, Farebox Interface		ls		
			Subtotal Onboard Systems	
CENTRAL SITE SYSTEMS (installed)				
Dispatch Consoles - Software		ea		
Dispatch Consoles - Hardware		ea		
Dispatch Console Licenses		ea		
Central Processing/CAD System - Software		ls		
Central Processing/CAD System - Hardware		ls		
Central Processing/CAD System Licenses		ls		
Trapeze Interface - PASS		ls		
Trapeze Interface - OPS/Yard		ls		
Hastus Interface		ls		
Sound Transit Interface		ls		
Data Export/Views Interface		ls		
Other Interfaces (as needed)		ls		
Desktop Display System		ls		
Desktop Display Licenses		ea		
Traveler Information Website		ls		
Reporting - NTD		ls		
Reporting - Other		ls		
			Subtotal Central Site	
ROADSIDE SYSTEMS (installed - see notes)				
BRT station equipment (2 signs/stop)		ea		
1-Line sign and SBS equipment		ea		
2-Line sign and SBS equipment		ea		
3-Line sign and SBS equipment		ea		
4-Line sign and SBS equipment		ea		
			Subtotal Roadside Systems	

Item/Description	Quant	Unit (ea or ls)	Unit Price (USD)	Extended Price (USD)
PART 1: REQUIRED ITEMS CONTINUED				
COMMUNICATIONS SYSTEMS (installed - see notes)				
Data Radio System - Base Stations		ea		
Onboard Data Radio (excluding install. costs)		ea		
Remote Data Terminal Communications		ls		
Wireless LAN		ls		
BRT Temporary Communications		ls		
			Subtotal Communications Systems	
ONBOARD INSTALLATION COSTS (see notes)				
BRT Vehicles		ea		
Paratransit Vehicles		ea		
Fixed Route Vehicles - Option 1		ea		
Fixed Route Vehicles - Option 2		ea		
			Subtotal Onboard Installation	
TESTING				
Testing Stage 1 - FAT		ls		
Testing Stage 2 - SIT		ls		
Testing Stage 3 - OIT		ls		
Testing Stage 4 - Radio Coverage		ls		
			Subtotal Testing	
TRAINING				
Onboard Operations Course		ea		
Transit Operations Course		ea		
Maintenance Course		ea		
System Administration Course		ea		
Radio System Course		ea		
Reporting Course		ea		
IT Training Course		ea		
Follow-up Training		ls		
			Subtotal Training	
WARRANTY AND MAINTENANCE				
Warranty		ls		
Spare Parts (attach list of proposed spares)		ls		
Test Bench		ea		
			Subtotal Training	

TOTAL PART 1: _____

Item/Description	Quant	Unit (ea or ls)	Unit Price (USD)	Extended Price (USD)
PART 2: OPTIONAL ITEMS				
DRIVER DISPLAY UNIT INTEGRATION				
Driver Display Unit Integration		ls		
Subtotal Driver Display Unit Integration				
INTERACTIVE VOICE RESPONSE PHONE SYSTEM				
Interactive Voice Response Phone System		ls		
Subtotal Voice Response System				
INTEGRATION WITH ONBOARD CAMERAS				
Integration with Onboard Cameras		ls		
Subtotal Onboard Camera Integration				
POST-WARRANTY MAINTENANCE				
Years 1-5		per yr		
Years 6-10		per yr		
Years 10-15		per yr		
Beyond year 15		per yr		
Subtotal Post-Warranty Maintenance				

TOTAL PART 2: _____

Grand Total Parts 1 and 2: _____

NOTES:

- The Contractor shall complete the price sheet inserting quantities, unit costs, extended costs and totals.
- Do not include Applicable Washington State sales or use tax in the prices proposed.
- The Contractor may include in its Proposal additional price breakdown information in support of the prices listed, however the provision of such information shall not relieve the Contractor of, or limit its obligations to, deliver a complete system as described in this RFP.
- Unless otherwise identified on the price sheet as a separate line item, prices shall include all management, administration, design, development, documentation, Contractor and third party licenses, installation and testing costs, and shall include all associated wiring, brackets, connectors, hardware, mounts, and prototypes required to meet the obligations of this RFP.
- If the Contractor believes that an item of work is not covered by the Price Sheet items as listed, the Contractor shall include the cost in the closest applicable item and include an explanatory note to this effect.
- For the data radio system, the Contractor shall include prices for its preferred option (12.5 KHz or 25KHz) in the Price Sheets, and shall attach additional information including pricing for the second option.
- For the Roadside Systems, the Contractor shall include pricing for all BRT stations/stops. For the 1-, 2-, 3- and 4-line signs for Community Transit park-and-rides, the Contractor shall indicate unit prices only (i.e. quantities of “1”). Final quantities will be determined through negotiations with the preferred Contractor or Contractors.
- For the onboard system installation costs, the Contractor shall include pricing for all BRT and paratransit vehicles. For other Community Transit fixed route and manager vehicles, the Contractor shall indicate unit prices only (i.e. quantities of “1”) for the two installation options. The Contractor may attach any assumptions or further information regarding pricing or minimum vehicle quantities for either option (e.g. ranges of vehicle quantities such as 1-50, 50-100, etc.).
- All applicable Washington State sales or use tax must be itemized as a separate line item on all Contractor invoices.
- All Contractor invoices shall be accompanied by packing slips or other documentation confirming delivery of any supplied materials, quantities and serial numbers.
- All line items must indicate any and all charges to accommodate the service requirements.

- Community Transit reserves the right to add or delete services or equipment quantities at the specified prices as needed throughout the term of the contract.
- Community Transit reserves the right to reject any and all proposals.
- Community Transit reserves the right, without limit, to modify the scope and extents of the project prior to Contract execution.

NO PROPOSAL FORM

Project Name**: RFP #50-07, ADVANCED PUBLIC TRANSPORTATION SYSTEM (APTS) PROCUREMENT**

Dear Prospective Proposer:

If you determine not to submit a proposal in response to this solicitation, we would very much appreciate that you complete and return this form for our files.

Proposal #: RFP #__-__

Proposal Title: Advanced Pubilic Transportation System (APTS) Procurement

Proposer's Company Name: _____

Address: _____

Telephone Number: _____

Contact Person: _____

Reason for not submitting a proposal in response to this solicitation:

_____

_____

_____

_____

_____

_____

_____

Thank you for your assistance.

Community Transit
7100 Hardeson Road
Everett, WA 98203
Attention: Gerhild Turner, CPPO, CPPB
Procurement Supervisor

RFP #50-07
ADVANCED PUBLIC TRANSPORTATION SYSTEM (APTS) PROCUREMENT

SECTION 5.0

PROCUREMENT PROTEST PROCEDURES

SECTION 5.0 – PROCUREMENT PROTEST PROCEDURES

5.00 APPEALS TO COMMUNITY TRANSIT

Vendors have the right to appeal a proposal solicitation or award of contract issued by Community Transit pursuant to the following procedural steps:

5.00.1 Pre-Award

A. Prior to the proposal due date, vendors may submit an appeal or protest based on the specifications or other terms in a solicitation document which are apparent prior to the date established for submission of the proposal. Any such appeal or protest shall be submitted in writing and addressed to the Community Transit Chief Financial Officer no later than seven (7) business days prior to the date established for submission of the proposal. The Chief Financial Officer shall give consideration to all facts and issues involved with the appeal or protest and provide a written decision within five (5) business days following receipt of the appeal or protest.

B. In the event that a vendor is not satisfied with the decision rendered by the Chief Financial Officer, the vendor shall have the right to appeal to the Chief Operating Officer. The appeal of the Chief Financial Officer 's decision must be received in the office of the Chief Operating Officer within five (5) business days following receipt of the Chief Financial Officer 's decision. The Chief Financial Officer shall present all relevant facts and issues to a committee chaired by the Chief Operating Officer which includes General Counsel and the Department or Division Head who requisitioned the purchase. The Chief Operating Officer will return a written decision to the vendor presenting the appeal within five (5) business days of receiving the appeal or protest.

C. A vendor shall have the right to seek further remedy should the decision of the Chief Operating Officer not be acceptable. The vendor shall provide a written appeal to the Chief Executive Officer within five (5) business days of receiving the decision of the Chief Operating Officer.

The Chief Executive Officer shall give consideration to all relevant facts and render a decision within five (5) business days of receiving the vendor's appeal. The decision of the Chief Executive Officer shall be final and binding.

D. When the award is funded in part by FTA funds, the vendor may appeal to FTA pursuant to FTA regulations. FTA will only review protests regarding the alleged failure of Community Transit to have followed such protest procedures. Any such appeal to FTA must be in writing and received by FTA not later than five (5) business days following a final decision rendered by Community Transit or after Community Transit has failed to render a final decision on the protest.

5.00.2. Post-Award

A. Vendors may appeal or protest a contract award as soon as is practical following the notification of award, but no later than five (5) business days following the notification of award. All protests and appeals shall be submitted in writing and be addressed to the Community Transit Chief Financial Officer. The Chief Financial Officer will give consideration to all facts and issues involved with the appeal and provide a written decision within five (5) business days following receipt of the appeal or protest.

B. In the event that a vendor is not satisfied with the decision rendered by the Chief Financial Officer, the vendor shall have the right to appeal to the Chief Operating Officer. The appeal of the Chief Financial Officer 's decision shall be received in the office of the Chief Operating Officer within five (5) business days following receipt of the Chief Financial Officer 's decision. The Chief Financial Officer shall present all relevant facts and issues to a committee chaired by the Chief Operating Officer which includes General Counsel and the Department or Division Head who requisitioned the purchase. The Chief Operating Officer will return a written decision to the vendor presenting the appeal within five (5) business days of receiving the appeal or protest.

C. A vendor shall have the right to seek further remedy should the decision of the Chief Operating Officer not be acceptable. The vendor shall provide a written appeal to the Chief Executive Officer within five (5) business days of receiving the decision of the Chief Operating Officer.

The Chief Executive Officer shall give consideration to all relevant facts and render a decision within five (5) business days of receiving the vendor's appeal. The decision of the Chief Executive Officer shall be final and binding.

D. When the award is funded in part by FTA funds, the vendor may appeal to FTA pursuant to FTA regulations. FTA will only review protests regarding the alleged failure of Community Transit to have followed such protest procedures. Any such appeal to FTA must be in writing and received by FTA not later than five (5) business days following a final decision rendered by Community Transit or after Community Transit has failed to render a final decision on the protest.